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WASTE MANAGEMENT GUIDELINES FOR PETROLEUM MARKETING OPERATIONS

PACE REPORT NO. 87-6

Prepared for:

Petroleum Association for Conservation
of the Canadian Environment
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DISCLAIMER

No responsibility is accepted by PACE, its consultant or any of its members concerned with the preparation, production or publication of this report, for any statement therein or omission therefrom resulting in any loss, damage or injury whatsoever to any party using the report.

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(Chairman)	Dr. Kong S. Ng	- Husky Oil Operations Ltd.
	Mr. Ron I. Alexander	- Petro-Canada Products
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	Mr. W. Gavin Hamilton*	- Esso Petroleum Canada

* Retired prior to completion of project.

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FOREWORD

The purpose of this manual is to present principles and practical information for persons who are responsible for managing waste at petroleum marketing facilities. It provides the management and company environmental personnel with an overview of the current Canadian legislation dealing with waste and how wastes are classified under law. Also, it presents a comprehensive list of marketing wastes, and for each waste, it identifies the type of marketing facility where it may be found. The manual suggests model policies and procedures for facility waste management. For the sake of completeness it provides a section that explains modern waste treatment technology and disposal methods.

Possibly the most useful section in the day-to-day work of the operator will be Part I Section 4.0. It contains specific guidelines for handling and disposal of each waste. This section is modelled on a companion volume (PACE Report 86-2 for petroleum refinery wastes) that uses a system of single data sheets on which relevant information on a specific waste stream, is summarized. The system lends itself to continuous updating to ensure that the latest information, both legislative and technical, is reflected in the waste data sheet.

The Guidelines establish a framework for the petroleum marketing industry to develop company and site specific waste management programs. It is at the discretion of each company to adopt and phase in part or any of the recommendations that are compatible to their operating philosophy and economic constraints.

WASTE MANAGEMENT GUIDELINES

FOR PETROLEUM MARKETING OPERATIONS

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EXECUTIVE SUMMARY

The objective of this manual is to provide guidance to the management, environmental personnel and supervisors of petroleum Marketing facilities, thereby improving the management of waste materials from these sources.

Effective waste management is extremely important to industry today. This is particularly relevant to the Petroleum industry, many of whose wastes could present a potential hazard to public health or the environment, if not handled properly. Petroleum marketers often interface with the public at establishments such as service stations and consumer outlets. Many have become aware of the adverse consequences of not living up to public environmental expectations. As a result, it is particularly important that they have up to date information to manage their wastes in accordance with good environmental practice.

The main focus of the manual is the section on "Waste Data Sheets" (Part I - Section 4) The user friendly "Waste Data Sheet" is unique in that all essential information about a waste stream is condensed onto a doubled sided single sheet of paper. Using a loose-leaf format allows for easy revision or updating that is so important in a rapidly changing field, such as waste management.

During the preparation of this Manual a survey of marketing establishments was carried out by PACE in order to assess the current situation. The survey was conducted by means of face-to-face interviews with Marketing plant operators, in each region of Canada, identified by the Task Force. The intent was to cover as many regions across Canada and to obtain a good cross section of different Marketing operations. In all, thirteen establishments, from Halifax to Vancouver, were surveyed.

Highlights of the findings include:

- 34 different petroleum marketing wastes were identified.
- Disposal methods used are generally simple and not technologically sophisticated.
- Many Marketers recycle wastes back to the parent refinery for treatment or disposal.
- Licensed waste contractors are used frequently. In the majority of cases, it was found that operators had little or no knowledge of the final treatment/disposal and environmental consequences of contractor hauled wastes.
- Generally, service stations do not promote the collection of used crankcase oil from "do it yourself" sources.

The manual also provides an overview of Canadian legislation on the subject, offers examples in-plant policies and procedures to be followed; addresses transportation, technology of treatment and disposal aspects.

Appendices present additional sources of information of direct use to environmental staff, field engineers, facility supervisors and operators, including a listing of used oil reclamation facilities and environmental agencies capable of answering questions and providing assistance to the marketing plant personnel.

Managers of petroleum marketing operations should be conscious of the trends in regulatory development and the public mood associated with the issue of waste management in this country. In recent years governments are turning to stiffer penalties and even jail sentences for company executives and their agents, when wastes are handled in a negligent or irresponsible manner.

The fact that there are over 20,000 marketing facilities in Canada means that in aggregate the wastes generated by the Marketing sector are significant and every effort to reuse or reclaim them should be made. This is in keeping with the general position taken by the Petroleum industry, i.e. emphasizing, as a first step, the reduction of environmental emission at the source.

In the final analysis, the "Waste Management Guidelines for Petroleum Marketing Operations" will assist the industry by:

(1) advancing the principles of good waste management practices, and

(2) by setting a framework for marketing facility managers to develop their own site specific waste management programs.

RESUME

Ce manuel vise à guider la direction, le personnel chargé des questions environnementales et les superviseurs des installations de distribution des produits pétroliers dans l'amélioration de la gestion des déchets produits en cours de leurs activités.

La gestion efficace des dechets est une question de grande importance pour le secteur industriel de nos jours. Ceci s'applique surtout à l'industrie pétrolière dont plusieurs des déchets pourraient présenter un danger potentiel pour la santé publique ou pour l'environnement s'ils n'etaient pas manutentionnés convenablement. Les distributeurs de produits pétroliers sont souvent en contact avec le public aux installations comme les stations-service et les débits de détail. Plusieurs se sont rendus compte que ne pas satisfaire aux attentes environnementales de la population entraîne des conséquences néfastes. Il est donc très important pour eux de posséder des informations à jour leur permettant de gérer leurs déchets d'une façon conforme aux bonnes pratiques environnementales.

La partie principale de ce manuel est la section consacrée aux feuilles de renseignements sur les déchets (Part I - Section 4: Waste Data Sheets). Cette feuille, facilement remplie, est unique du fait que toute l'information essentielle sur une source donnée de déchets est condensée sur les deux côtés d'une seule feuille de papier. Le support à feuilles mobiles facilite la révision et la mise à jour qui sont des opérations très importantes dans un domaine qui évolue aussi rapidement que la gestion des déchets.

Dans le cadre de la préparation de ce manuel, l'APCE a mené une enquête auprès des établissements de distribution et de ventes des produits pétroliers pour évaluer la situation courante. L'enquête s'est effectuée au moyen d'entrevues personnelles avec des exploitants des établissements de distribution identifiés par le groupe de travail dans toutes les régions du Canada. L'objet de l'enquête était de couvrir autant de régions que possible et d'obtenir une sélection représentative des différentes opérations de distribution. En tout, treize installations, de Halifax à Vancouver, ont participé à l'enquête.

Les points saillants des constatations sont:

- 34 déchets distincts associés à la distribution des produits pétroliers ont été identifiés;
- les méthodes d'élimination utilisées sont généralement simples et technologiquement rudimentaires;
- de nombreux distributeurs renvoient les déchets à la raffinerie mère aux fins de traitement ou d'élimination;

- on a fréquemment recours aux entrepreneurs licenciés. Dans la majorité des cas, on a constaté que les exploitants n'étaient peu ou pas du tout renseignés sur la façon que leurs déchets étaient traités ou éliminés ou sur les conséquences environnementales de leur traitement ou élimination par l'entrepreneur chargé de leur évacuation.

- en général, les stations-service ne font pas la promotion de la collecte de l'huile moteur des sources privées.

Le manuel contient également un aperçu de la législation canadienne pertinente et présente des exemples de politiques et procédures à suivre dans les installations. Il traite en outre du transport, de la technologie de traitement et des divers aspects de l'élimination.

Les appendices présentent des sources additionnelles d'information qui seraient utiles au personnel environnemental, aux ingénieurs de terrain, aux superviseurs et aux exploitants d'installations, y compris une liste d'installations de régénération des huiles usagées et des organismes environnementaux qui sont capables de repondre aux questions du personnel des installations de distribution et de leur fournir une aide.

Les gérants des opérations de distribution de produits pétroliers devraient être conscients des tendances au chapitre de la réglementation et de l'attitude de la population envers la gestion des déchets dans ce pays. Les gouvernements imposent depuis quelques années des peines plus sévères et même des peines d'emprisonnement aux cadres et à leurs agents lorsque les déchets sont traités d'une manière négligeante ou irresponsable.

Le fait qu'il existe plus de 20,000 installations de distribution et de ventes aux Canada signifie que les quantités de déchets générées par ce secteur sont importantes et qu'on devrait faire tout notre possible pour en assurer la récupération ou la régénération. Cet objectif est conforme à la position générale adoptée par l'industrie pétrolière voulant que l'accent soit mis en premier lieu sur la réduction des émissions environnementales à la source.

Finalement, ce manuel fera un apport précieux à notre industrie de distribution des produits de pétrole en:

(1) promouvant les principes des pratiques efficaces de gestion des déchets; et

(2) établissant un cadre que les gérants d'installations de distribution et de ventes peuvent utiliser pour élaborer leurs propres programmes de gestion de déchets.

PART I

WASTE MANAGEMENT GUIDELINES

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WASTE MANAGEMENT GUIDELINES

1.0 Marketing Perspective

The Canadian petroleum industry distributes its products through a number of facilities and systems prior to reaching the consumer. These consist of storage terminals or transfer points to a variety of bulk carriers, bulk product handling plants, blending and packaging plants, service stations and other customer retail outlets, such as convenience stores.

According to Oilweek June 8, 1987, the volume of finished petroleum products in 1986 totalled some 230,000 m^3/day (1.5 million barrels per day).

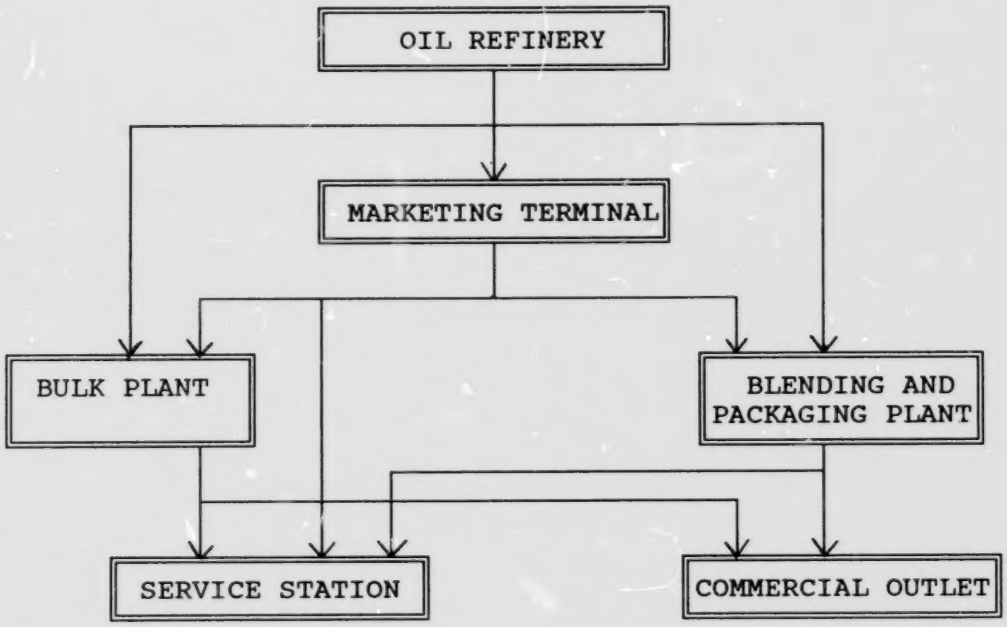
The following is a brief description of various types of marketing facilities used in Canada.

1.1 Product Terminals

Product terminals are generally large volume storage facilities containing finished petroleum products such as diesel, furnace oils, gasoline and aviation fuels. These terminals are usually associated with, and situated close to refineries, the source of supply. Product shipments from terminals are made by either pipeline, rail car, tank car, tank truck, barge or tanker. A terminal generally has an office and warehouse for storage and handling of drummed and packaged products such as lube oils, grease containers, specialty products such as brake fluids and transmission oils. Terminals may also have areas for housing trucks, truck maintenance and/or truck washing facilities.

FIGURE I - 1

MARKETING DISTRIBUTION



1.2 Bulk Plants

Bulk plants generally receive petroleum products by tank car or tank truck. These products are stored in smaller storage tanks usually less than 450,000 litres. Bulk plants are either operated by an oil company through an agent or by an independant distributor. A small warehouse and an office is generally associated with the bulk plant. Products shipped from these facilities are generally diesel, furnace oil, light distillates and motor gasolines.

1.3 Blending and Packaging Plants

These are plants that receive petroleum base stocks from the refinery or purchased sources and they are stored along with chemical additives in small storage tanks. These plants custom blend formulations of lubricating oils and greases and package these commodities in a variety of containers. Other specialty products such as solvents and lighter fluids, are also packaged and distributed to retail markets.

1.4 Service Stations

Service stations are the final distribution point for major product lines such as gasolines, liquified petroleum gases and diesel. These are fuels that are used by the motoring public. In addition lubricating oils and specialty automotive products such as batteries, tires, cleaning fluids, barbecue lighter fluids and naphthas are sold. Many service stations also have facilities for lubricating and greasing automobiles and trucks and a number of them are equipped with car washing and repair facilities. Service stations are generally equipped with underground storage tanks for three grades of gasoline, regular (leaded), unleaded, premium unleaded as well as diesel fuel. Some facilities are equipped to sell natural gas and propane as motor fuels.

PACE estimates some 65% of service stations have oil interceptors in the service bay area for segregration of oil and sludge from waste water prior to discharging the water to the municipal sewer.

A recent survey of service station retail outlets (June 2, 1986) in Canada, carried out by Oilweek, is summarized in Tables 1 and 2. Due to continued pressure on the industry to rationalize its distribution network, the total number of service station outlets now stands at close to 19,000 compared with 24,000 in 1980.

1.5 Other Commercial Outlets

Commercial outlets are those facilities owned by independent operators for the storage and dispensing of refined products. Typically they consist of one or more underground or above ground tanks and a simple dispensing system. Taxi fleets, trucking and some government departments generally have such facilities.

2.0 Sources of Wastes

Each of the marketing facilities, described in the preceding section, is a potential source of waste materials requiring proper management. In this Guideline wastes have been classified, for convenience, into four general groupings or categories as follows:

A - Storage and Handling Wastes
B - Facilities and Process Wastes
C - Automotive Wastes
D - Miscellaneous Wastes

These are shown schematically on Figure 1-2.

TABLE I - 1

RETAIL GASOLINE OUTLETS BY PROVINCE

May 1, 1987

	B.C.	Alta.	Sask.	Man.	Ont.	Que.	N.B.	N.S.	P.E.I.	Nfld.	N.W.T.& Yukon	Total
Les Petroles Calex	--	--	--	--	3	42	--	--	--	--	--	45
Canadian Tire	--	8	2	3	83	19	--	--	--	--	--	115
Chevron Canada	300	--	--	--	--	--	--	--	--	--	--	300
Domo	6	14	--	21	--	--	--	--	--	--	--	41
Fas Gas Oil	--	54	4	--	--	--	--	--	--	--	--	58
Federated Co-ops	42	63	318	80	--	--	--	--	--	--	--	503
Mr. Gas Ltd.	--	--	--	--	35	7	--	--	--	--	--	42
Husky	61	67	23	21	38	--	--	--	--	--	3	213
ICG Liquid Gas	16	13	9	3	5	--	--	--	--	--	--	46
Imperial Oil	394(C)	325(D)	280	224	711	553	152	179	33	194	--	3046
Irving Oil (E)	--	--	--	--	--	752	523	285	29	152	--	1741
Mohawk Oil	82	113	37	25	3	--	--	--	--	--	--	260
Payless Oil	--	55	1	--	--	--	--	--	--	--	--	56
Petro-Canada	459	438	299	239	1399	790	81	130	13	15	21	3890
Pioneer Petroleums	--	--	--	--	70	--	--	--	--	--	--	70
Sergaz Inc.	--	--	--	--	--	228	--	--	--	--	--	228
Shell Canada	321	296	218	306	1206	852	112	114	28	--	6	3459
Steva Petroleums	--	--	--	--	90(A)	126(B)	--	--	--	--	--	216
Suncor Group	--	2	--	--	600	230	--	--	--	--	--	832
Tempo Petroleum	10	22	114	85	5	--	--	--	--	--	--	236
Texaco Canada	150	211	125	128	746	532	107	98	23	38	--	2158
Top Value Gasmarts	--	--	--	--	88	27	--	--	--	--	--	115
Turbo Resources	36	136	53	11	1	--	--	--	--	--	2	239
Ultramar Canada	--	--	--	--	185	949	34	71	6	241	--	1486
V Plus	--	--	--	--	30	--	--	--	--	--	--	30
Totals	1877	1817	1483	1148	5298	5107	1015	877	132	640	32	19424

(A) D-X Oil in Ontario
(B) Independent gas stations in Quebec
(C) Includes Yukon
(D) Includes N.W.T.
(E) Estimate

Source: OIL WEEK SURVEY (June 2, 1986)

TABLE I - 2

RETAIL OUTLETS BY TYPE AND SERVICE

May 1, 1986

	Total	Leased	Inde-pendent	Company Operated	Unbranded Discount	Self-Serve	NGV Available	Diesel Available	Propane Available
Les Petroles Calex	45	--	45	--	--	NA	NA	NA	NA
Canadian Tire	115	--	--	115	--	82	--	4	3(D)
Chevron Canada	300	126	96	78(C)	--	97	1	26	35
Domo	41	--	--	41	--	--	--	--	--
Fas Gas Oil	58	--	--	58	--	3	--	20	13
Federated Co-ops	503	--	503	--	--	--	--	89	111
Mr. Gas Ltd.	42	42	--	--	--	--	--	19	10
Husky	213	190	23	--	--	15	8	151	59
ICG Liquid Gas	46	--	--	46	--	--	2	--	46
Imperial Oil	3 045	819	2 124	78	24	634	--	835	12
Irving Oil (E)	1 741	NA	NA	NA	NA	NA	NA	NA	NA
Mohawk Oil	260	35	94	131	--	--	1	91	125
Payless Oil	56	--	54	2	--	2	--	10	6
Petro-Canada	3 890	1 161	2 121	608(A)	65	1 192	7	906	266
Pioneer Petroleums	70	20	10	40	--	1	--	30	8
Sergaz Inc.	228	24	150	54	--	2	--	131	5
Shell Canada	3 459	910	2 390	159	85	557	15	480	150
Steva Petroleums	216	--	82	134	--	4	--	132	10
Suncor Group	832	230	483	72	47	159	--	172	23
Tempo Petroleum	236	236	--	--	--	8	--	23	23
Texaco Canada	2 158	886	1 272	--	48	585	1	534	21
Top Value Gasmarts	115	62	45	8	--	3	--	51	8
Turbo Resources	239	164	75	--	--	10	--	144	127
Ultramar Canada (B)	1 486	NA	NA	NA	NA	NA	NA	NA	NA
V Plus	30	30	--	--	30	--	--	23	--
Totals	19 424	4 935	9 567	1 624	299	3 354	35	3 871	1 081

(A) Includes commissioned outlets
(B) Breakdown not available, Gulf acquisition
(C) Includes agenia
(D) Propane at 84 model outlets
(E) Estimate

Source: OIL WEEK SURVEY (June 2, 1986)

FIGURE I-2 - MARKETING WASTE CATEGORIES

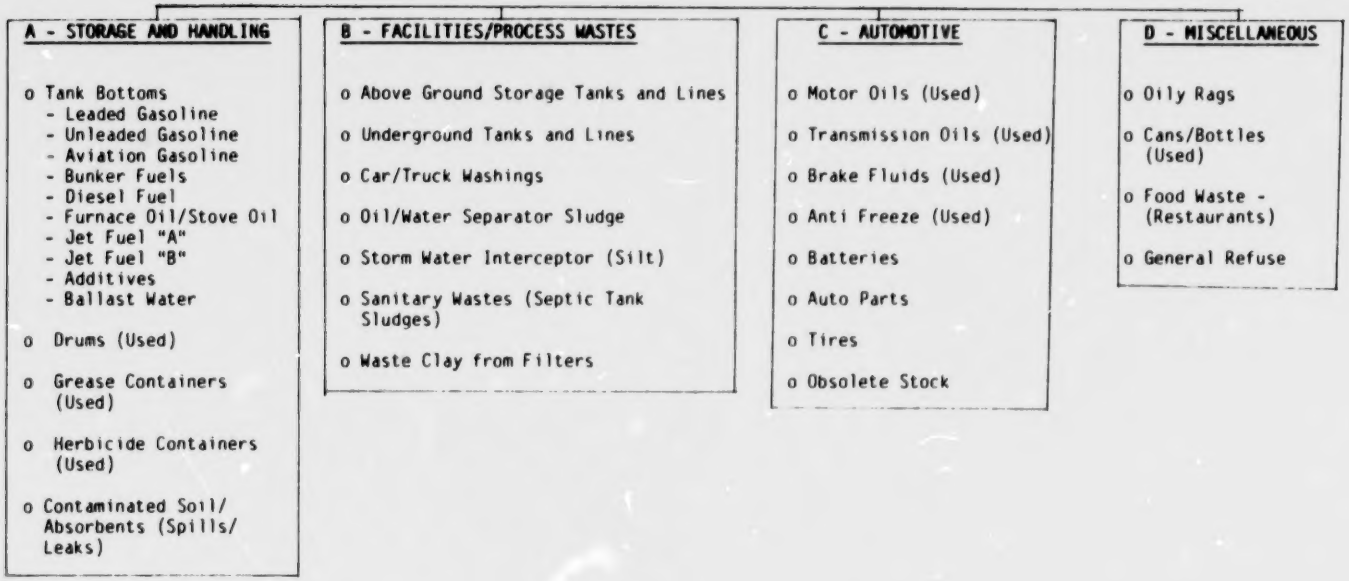


TABLE I-3

WASTE CATEGORY CODE

CODE	WASTE CATEGORY
A	Storage and Handling
B	Facilities/Process Wastes
C	Automotive Wastes
D	Miscellaneous (All Others)

NOTE: This Table shows the Code used in grouping wastes, into categories. Each Waste Data Sheet (WDS) is given a 2 part number made up of the Category Code (i.e. A,B,C or D) and a numerical, e.g. A-9 refers to Additive Tank Bottoms, a waste belonging to the Storage and Handling Category.

TABLE I-4

WASTE DATA SHEETS (WDS)

IN RELATION TO MARKETING FACILITIES

WDS # NUMBER	MARKETING WASTES	DATE ISSUE REV'D	WASTE SOURCE: TERMINALS	BULK PLANTS	BLENDING AND PACKAGING	SERVICE STATIONS
A SERIES - STORAGE AND HANDLING						
A-1	Leaded Gasoline - Tank Bottoms		o	o		o
A-2	Unleaded Gasoline - Tank Bottoms		o	o		o
A-3	Aviation Gasoline - Tank Bottoms		o	o		
A-4	Bunker Fuel - Tank Bottoms		o			
A-5	Diesel Fuel - Tank Bottoms		o	o		o
A-6	Furnace/Stove Oil		o	o		
A-7	Jet Fuel (Jet A) - Tank Bottoms		o	o		
A-8	Jet Fuel (Jet B) - Tank Bottoms		o	o		
A-9	Additives - Tank Bottoms		o	o	o	
A-10	Water Ballast - Tank Bottoms		o			
A-11	Drums (Used)		o	o	o	o
A-12	Grease Containers (Used)		o		o	o
A-13	Herbicide Containers (Used)		o	o	o	o
A-14	Contaminated Soil/Absorbents (Spills/Leaks)		o	o	o	o
B SERIES - FACILITIES/PROCESS WASTE						
B-1	Above Ground Tanks and Lines (Scrap)		o	o		
B-2	Underground Tanks and Lines (Scrap)		o	o	o	o
B-3	Car Truck Washings (Waste Water and Silt)		o	o	o	o
B-4	Oil Water Separator Sludge		o	o	o	o
B-5	Storm Water Interceptors (Contaminated Silt)		o	o	o	o
B-6	Sanitary Waste (Septic Tank Sludge)		o	o	o	o
B-7	Waste Clay from Filters				o	
C SERIES - AUTOMOTIVE WASTES						
C-1	Motor Oils (Used)		o			o
C-2	Transmission Oils (Used)					o
C-3	Brake Fluids (Used)		o			o
C-4	Anti Freeze (Used)		o			o
C-5	Batteries (Used)			o		o
C-6	Brake Shoes (Used)		o			o
C-7	Auto Parts (Used)					o
C-8	Tires (Used)		o			o
C-9	Obsolete Stock		o	o	o	o
D SERIES - MISCELLANEOUS WASTES						
D-1	Oily Rags		o	o	o	o
D-2	Cans/Bottles (Used)		o	o	o	o
D-3	Food Wastes (Service Station Restaurants)					o
D-4	General Refuse		o	o	o	o

3.0 Use of Waste Data Sheets

Each type of waste is described with on a "stand alone" Waste Data Sheet (WDS). Each sheet bears a code number for example B-3. The B identifies the category of the waste, in this case Facilities/Process, while the 3 represents Car and Truck Washing Wastes. See Tables 1-3 and 1-4.

Relevant available information on each waste is condensed onto a double-sided sheet that provides the user with information to deal with the storage, handling, treatment and disposal of the waste.

In using the WDS some judgment must still be used in their implementation. For example after leaded tank bottom sludges have been weathered or oxidized, the recommended disposal method is a secure landfill. The operator or supervisor must still assure himself that the landfill is properly designed and that it meets the necessary company and government environmental standards prior to depositing this waste material.

Special wastes or additional new wastes can be coded and added to the WDS at any time due to the loose leaf format. A small supply of blank WDS is provided at the end of this section for that purpose.

4.0 REFERENCES

INDUSTRIAL SAFETY AND HYGIENE SECTIONS OF WASTE DATA SHEETS

1) "Guidelines for the Selection of Chemical Protective Clothing". Published by the ACGIH (American Conference of Governmental Industrial Hygienists), 1985.

2) "Chemical Protective Clothing Guidelines". These recent guidelines were developed by the Industrial Hygiene Exposure Assessment and Control Group of the API Health and Environmental Science Departments.

3) "Heating and Cooling of Man in Industry". Published by the AIHA (American Industrial Hygiene Association).

4) Industrial Eye and Facial Protection". A CSA (Canadian Standards Association) Z94.3 - M1982 standard.

5) "Respiratory Selection". A CSA Z94.4 - M1982 standard. Other suitable ANSI (American National Standards Institute) standards may also be used.

6) "Compressed Breathing Air Standard". CAN-3-Z180.1 - M1985, developed by CSA.

7) "Confined Space Entry". Publication No. B-01-228 available from IAPA, Toronto.

5.0 WASTE DATA SHEETS

PART I

WASTE DATA SHEET (WDS) INDEX

A SERIES - STORAGE AND HANDLING

WDS NO.	NAME OF WASTE	SYNONYM	DATE ISSUED/ REVISED
A-1	Leaded Gasoline - Tank Bottoms	Leaded Sludge	October 1987
A-2	Unleaded Gasoline - Tank Bottoms	Unleaded Sludge	October 1987
A-3	Aviation Gasoline - Tank Bottoms	Aviation Sludge	October 1987
A-4	Bunker Fuel - Tank Bottoms	Bunker Sludge	October 1987
A-5	Diesel Fuel - Tank Bottoms	Diesel Sludge	October 1987
A-6	Furnace Oil/Stove Oil	Oil Tank Sludge	October 1987
A-7	Jet Fuel "A" Tank Bottoms	Jet Fuel "A" Sludge	October 1987
A-8	Jet Fuel "B" Tank Bottoms	Jet Fuel "B" Sludge	October 1987
A-9	Additives - Tank Bottoms	Additive Tank Sludge	October 1987
A-10	Water Ballast - Tank Sludge	Ballast Tank Sludge	October 1987
A-11	Drums - Used	--	October 1987
A-12	Grease Containers - Used	--	October 1987
A-13	Herbicide Containers - Used	Agricultural Chemical	October 1987
A-14	Contaminated Soil/Absorbents (Spills and Leaks)	--	October 1987

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WASTE DATA SHEET

NAME OF WASTE: LEADED GASOLINE - TANK BOTTOMS **SHEET NO.** A-1

(SYNONYM) (LEADED SLUDGES) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Service Stations.

GENERAL DESCRIPTION: Sludges accumulate in the bottom of any tank or vessel containing leaded gasoline. These dull grey/black coloured sludges must be safely removed by trained personnel any time a tank is to be entered for repairs or serviced internally.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.9 - 0.96 **SOLUBILITY IN WATER:** Extremely low

APPEARANCE: Greyish black colour **ODOUR:** Characteristic gasoline odour

COMPOSITION: API reports the composition as:

	Average
Water	37.9%
Solids	59.0%
Oil	8.5%

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Organic lead compounds and various other heavy metals - TML -TEL, Manganese Compounds, organic dyes, anti-icing compounds, phenols, benzo(a)pyrene. API reports that the sludge phase contains 0.04 kg - 0.18 kg (0.1 - 0.4 lbs) of organic lead per tonne of sludge.

POTENTIAL HAZARDS: The Federal government and all Canadian provinces recognize lead sludges as hazardous wastes, dangerous to the skin and extremely toxic when vapours are inhaled. Tank bottom sludges may contain pyrophoric materials and could ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:

- Wear full impervious protective apparel such as gloves, footwear, coveralls, eye and facial protection.
- Approved respiratory equipment appropriate to the health hazard must be worn.
- Good personal hygiene must be practiced. Protective equipment must be decontaminated after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Can be stored in properly labelled steel vessels or drums.
- Vapour control is necessary.
- Treat waste as if it were gasoline.

HANDLING: Specific procedures must be followed. Use explosion-proof mechanical ventilation equipment. Due to presence of organic lead there is a potential for fire or explosion. Detailed API procedures must be followed during any storage tank cleaning. Prevent leaching of this waste or the decontamination "washings" into sub-surface waters. This volatile material will pose a fire hazard.

Since the volume of leaded sludge is generally small, hand tools such as brooms, scrapers, buckets, rags, etc. are generally used for cleaning purposes. All electrical equipment must be explosion-proof and suitable for hydrocarbon atmosphere. Use non sparking (brass) tools for sludge handling.

NAME OF WASTE: LEADED GASOLINE - TANK BOTTOMS **WASTE DATA SHEET NO.** A-1

(SYNONYM:) (LEADED SLUDGES)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): 9378 **TDGR CLASSIFICATION:** 6.1, 4.1

TYPE OF CARRIER: Must use Provincially licensed and certified carrier (closed tank vehicle).

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: The current survey shows that many major Marketing facilities use the services of their company Engineering Departments in disposing of leaded sludges. Some facilities take the sludge to nearby refineries which generally have approved weathering facilities. Weathering changes the organic lead (highly toxic) to the inorganic form. The sludge is spread to a depth of 8 cm (3 inches) or less on an impervious surface such as concrete or clay and allowed to weather. If the temperature is above 0°C (32°F) this will take approximately 4 weeks but a longer period is desirable. Storage vessels used to store leaded gasoline must never be used for storage of grain, foodstuff of any kind or potable water no matter how thoroughly the vessel has been cleaned or decontaminated.

DISPOSAL GUIDELINE:

Acceptable:
- Weathering of sludge according to API procedure followed by secure landfill.
- Chemical fixation.

Not Recommended:
- Incineration.
- Burying in drums.
- Non-controlled tank farm spreading.
- Raw sludge to sanitary landfill.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. American Petroleum Institute Publications 2015A "Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning" June 1982.
2. American Petroleum Institute Publication 2015 "Cleaning of Petroleum Storage Tanks".
3. PACE Report 86-2 "Waste Management Guidelines for Petroleum Refineries and Upgraders" 1986.

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WASTE DATA SHEET

NAME OF WASTE: UNLEADED GASOLINE - TANK BOTTOMS **SHEET NO.** A-2

(SYNONYM) (UNLEADED TANK SLUDGE) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Service Stations

GENERAL DESCRIPTION: Sludges accumulate in bottom of storage tanks and vessels containing unleaded gasoline. These grey/black sludges accumulate in the bottom of tanks after a number of years of use. These wastes must be removed by trained personnel when the tank is to be entered for repairs or servicing internally.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.72 - 0.85 **SOLUBILITY IN WATER:** Extremely low

APPEARANCE: Greyish black colour **ODOUR:** Characteristic gasoline odour

COMPOSITION: PACE reports the composition of unleaded gasoline sludges as follows:

Water	12%
Solids	45%
Oil	43%

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: PACE has reported the following contaminants present in unleaded gasoline sludge: Phenols 1.7 - 1.8 mg/kg, Benzo(a)pyrene 0.3 - 0.9 mg/kg. Metals - cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, salenium, vanadium and zinc. Organic dyes and anti-icing compounds.

POTENTIAL HAZARDS:
Heavy metals and benzo(a)pyrenes are highly toxic. Uncontrolled releases to the environment could cause contamination. Tank bottom sludges may contain pyrophoric materials and could ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:
- Wear full impervious protective apparel such as gloves, footwear, coveralls, eye and facial protection.
- Approved respiratory protection appropriate to the identified health hazard must be worn.
- Maintain good personal hygiene and decontamination equipment after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:
- Store in steel vessels or containers, properly labelled with appropriate steel cover.
- Treat waste as if it were gasoline.

HANDLING: In confined spaces specific procedures must be followed. Use explosion-proof mechanical ventilation equipment. This volatile material poses a fire hazard. Prevent leaching of this sludge, or decontamination "washings", into subsurface waters. Use non sparking (brass) tools for sludge handling.

NAME OF WASTE: UNLEADED GASOLINE - TANK BOTTOMS **WASTE DATA SHEET NO.** A-2

(SYNONYM:) (UNLEADED TANK SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed or certified closed tank vehicle.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Most of the sludges are removed in the refinery storage tanks but over a period of time might possibly carry over into the marketing tankage. Unleaded gasoline is usually blended from a number of base stocks to which are added dyes, gum inhibitors, detergents, anti-icing compounds and manganese compounds. A slight presence of mositure in the gasoline can assist precipitation of some of these materials. This study found that some sludges are disposed of at nearby refinery facilities.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming.
- Chemical fixation.
- Secure landfill.
- Incineration with scrubber.

Not Recommended:
- Sanitary landfill.
- Open dump burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 83-2 "The Significance of Trace Substances in Petroleum Industry Sludges Disposed of on Land" 1983.
2. American Petroleum Institute Publication 2015 "Cleaning of Petroleum Storage Tanks".
3. PACE Report 82-1 "Canadian Petroleum Industry Marketing Waste Survey"

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WASTE DATA SHEET

NAME OF WASTE: AVIATION GASOLINE - TANK BOTTOMS **SHEET NO.** A-3

(SYNONYM) (AVIATION GAS SLUDGE) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants

GENERAL DESCRIPTION: Sludges precipitated from aviation gasoline in storage tanks located at Terminals and Bulk Plants.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.9 - 0.96 **SOLUBILITY IN WATER:** Extremely low

APPEARANCE: Dull, grey/black colour **ODOUR:** Characteristic gasoline odour

COMPOSITION: While there is no specific data on aviation gasoline sludges available in the literature, data reported by API for leaded gasoline can be used to approximate the composition.

	Average
Water	37.9%
Solids	59.0%
Oil	8.5%

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Organic lead compounds, organic dyes, phenols, benzo(a)pyrene and other aromatics may be present. Sludge phase contains 0.04 kg - 0.8 kg (0.1 - 0.4 lbs) of organic lead per tonne of sludge.

POTENTIAL HAZARDS: The Canadian Federal and Provincial governments recognize lead sludges as extremely hazardous waste. This waste can be very toxic as a result of absorpiton following skin contact or inhalation of vapours, due to organic lead uptake. Tank bottom sludges may contain pyrophoric materials and could ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:

- Wear full impervious protective apparel such as gloves, footwear, coveralls, eye and facial protection.
- Approved respiratory equipment appropriate to the health hazard must be worn.
- Good personal hygiene must be practiced. Protective equipment must be decontaminated after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Can be stored in properly labelled steel tanks or vessels.
- Treat waste as if it were gasoline.

HANDLING Specific procedures must be followed. Use explosion-proof mechanical ventilation equipment. Due to presence of hydrocarbons there is a potential for fire or explosion. Detailed API procedures must be followed during any leaded gasoline storage tank cleaning. Prevent leaching of this waste, or the decontamination "washings", into subsurface waters. Use non sparking (brass) tools for sludge handling.

NAME OF WASTE: AVIATION GASOLINE - TANK BOTTOMS **WASTE DATA SHEET NO.** A-3

(SYNONYM:) (AVIATION GAS SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): 9378 **TDGR CLASSIFICATION:** 6.1, 4.1

TYPE OF CARRIER: Must use a Provincially licensed and certified vehicle carrier (closed tank vehicle).

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest required.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Most major marketing facilities use the advisory services of their company Environmental Departments for disposing of leaded sludges. This study found that refineries equipped with sludge weathering (exposure to air) facilities are commonly used for disposal. Weathering changes the highly toxic organic lead into the inorganic form. The sludge is spread to a depth of 8 cm (3 inches) or less on an impervious surface such as concrete or clay and allowed to weather. If the temperature is above $0^{o}C$ ($32^{o}F$) this will take at best only 4 weeks but a longer period is desirable. Storage vessels used to store leaded gasoline must never be used for storage of grain, foodstuff of any kind or potable water no matter how thoroughly decontaminated.

DISPOSAL GUIDELINE:

Acceptable:
- Weathering of sludge at approved location, according to API procedure, with final disposal to secure landfill
- Chemical fixation.

Not Recommended:
- Incineration
- Burying in drums
- Non-controlled tank farm spreading
- Sanitary landfill.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. American Petroleum Institute Publication 2015A "Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning", June 1982.
2. American Petroleum Institute Publication 2015 "Cleaning of Petroleum Storage Tanks".
3. PACE Report No. 86-2 "Waste Management Guidelines for Petroleum Refiners and Upgraders", 1986.

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WASTE DATA SHEET

NAME OF WASTE: BUNKER FUEL - TANK BOTTOMS **SHEET NO.** A-4

(SYNONYM) (BUNKER SLUDGE) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants

GENERAL DESCRIPTION: Over a period of time sludges will accumulate in the bottom of bunker tanks and must be removed. If not removed they may affect the BS & W specifications for such fuels.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.9 - 1.0 **SOLUBILITY IN WATER:** Slight

APPEARANCE: Colour: Black **ODOUR:** Strong hydrocarbon odour

COMPOSITION: Limited data in a 1980 PACE survey shows the following:

Oil	25-90%
Water	5-30%
Solids	5-75%

The solids may contain catalyst dust, sediment and heavy metals present in the original crude oil.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: May contain heavy metals, some of which are toxic. Polynuclear Aromatics (PNA's) may also be present in the sludge.

POTENTIAL HAZARDS: This waste can cause harm on skin contact and its vapours are considered harmful and inhalation should be avoided as lung irritation may result. If landfilled or landfarmed Polynuclear Aromatics (PNA's) and heavy metals leading may occur unless precautions in designing such facilities are taken. Tank bottom sludges may contain pyrophoric materials and could ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:

- Wear full impervious protective apparel such as gloves, footwear, coveralls, etc. as well as eye and facial protection.
- Approved respiratory protection appropriate to the identified health hazard must be worn.
- Good personal hygiene is essential. Protective equipment must be decontaminated after each use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Store in covered steel tanks or containers that are properly labelled.

HANDLING In enclosed spaces specific clean-out procedures must be followed. Use explosion-proof mechanical ventilation epuipment. Prevent leaching of this waste, or its decontamination "washings", into subsurface waters.

NAME OF WASTE: BUNKER FUEL - TANK BOTTOMS **WASTE DATA SHEET NO.** A-4

(SYNONYM:) (BUNKER SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed and certified vehicle approved for transporting oily sludges.

MAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: At present, bunker Fuel is stored only at a very few marketing facilities such as Marine Terminals. The high oil content of the sludge makes it a good candidate for reuse. One facility reported adding of a diluent and marketing the resulting mixture as a low-grade fuel. Removal of the sludge generally involves use of a hot diluent such as refinery light oil and recycling the mixture back to an oil refinery.

DISPOSAL GUIDELINE:

Acceptable:
- Recycling or reclamation.
- Landfarming.
- Secure landfill.
- Incineration.

Not Recommended:
- Open dumping.
- Sanitary landfill.
- Use for road oiling.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report No. 86-2 "Waste Management Guidelines for Petroleum Refiners and Upgraders".
2. PACE Report No. 80-4 "Canadian Petroleum Refining Waste Survey 1980".

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WASTE DATA SHEET

NAME OF WASTE: DIESEL FUEL - TANK BOTTOMS

SYNONYM (DIESEL SLUDGE)

SHEET NO. A-5

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Service Stations

GENERAL DESCRIPTION: Sludges precipitated from diesel oil tanks located at bulk plants and terminals. Over a period of years watery sludges may accumulate in all types of distillate tanks.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.8 - 0.9

SOLUBILITY IN WATER: Slight

APPEARANCE: Brownish colour

ODOUR: Strong Hydrocarbon odour

COMPOSITION: PACE survey of 1980 provides the following:

	Range
Oil	1-5%
Water	10%
Solids	85%

May also contain small amounts of Caustic and Merox depending upon treating process used at the refinery.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: In most cases, the sludge is largely inert, however, contaminants such as heavy metals, spent caustic and Polynuclear Aromatics (PNA's) may be present.

POTENTIAL HAZARDS:
Tank bottom sludges may contain pyrophoric materials which could ignite spontaneously. If such contaminants are suspected, their presence will have to be confirmed.

PERSONNEL PROTECTION REQUIRED:
- Wear full impervious protective apparel such as gloves, footwear, coveralls, etc. as well as eye and facial protection.
- Wear approved respiratory protection equipment appropriate to the identified health hazards.
- Maintain good personal hygiene. Decontaminate protective equipment after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:
- Properly labelled steel drums or concrete vessels.

HANDLING In confined spaces, specific procedures must be followed. Use explosion-proof mechanical ventilation equipment. Recognized API procedures must be used for any tank sludge containing caustic materials. Prevent leaching of this waste sludge or the decontamination washings into the subsurface waters. Avoid spillage.

NAME OF WASTE: DIESEL FUEL - TANK BOTTOMS **WASTE DATA SHEET NO.** A-5

(SYNONYM:) (DIESEL SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Waste generator to classify. (See Page II-20).

TYPE OF CARRIER: Provincially licensed and certified vehicle approved for oil sludge hauling.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Many refineries still employ caustic washing and/or Merox fixed bed sweetening for removal of odorous materials. Hydrogen treatment of diesel fuels will tend to decrease the amount of sludge for disposal in the future.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming
- Secure landfill
- Chemical fixation

Not Recommended:
- Sanitary landfill

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 80-4 "Canadian Petroleum Refining Industry Waste Survey" 1980.
2. PACE Report 86-2 "Waste Management Guidelines for Petroleum Refineries and Upgraders" 1986.

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WASTE DATA SHEET

NAME OF WASTE: FURNACE OIL/STOVE OIL

(SYNONYM) (OIL TANK SLUDGE)

SHEET NO. A-6

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants.

GENERAL DESCRIPTION: Sludges precipitate from domestic fuel oil and stove oil tanks located at Bulk Plants and Terminals. Watery sludges can be expected to be found in tank bottoms after a number of years of service.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.8 - 0.9

SOLUBILITY IN WATER: Slight

APPEARANCE: Brownish colour

ODOUR: Strong Hydrocarbon odour

COMPOSITION: PACE survey of 1980 provides the following:

	Range
Oil	1-5%
Water	10%
Solids	85%

May also contain small amounts of Caustic and Merox depending upon treatment system at refinery.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: In most cases, the sludge is largely inert, however, contaminants such as heavy metals, spent caustic and Polynuclear Aromatics (PNA's) may be present.

POTENTIAL HAZARDS: Heavy metals and benzo(a)pyrene are highly toxic. Uncontrolled releases to the environment could cause contamination. Tank bottom sludges may contain pyrophoric materials and could ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:

- Wear full impervious protective apparel such as gloves, footwear, coveralls, as well as eye and facial protection.
- Wear approved respiratory protection equipment appropriate to the identified health hazards.
- Maintain good personal hygiene. Decontaminate protective equipment after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Concrete or steel vessels such as drums properly labelled and covered.

HANDLING In confined spaces, specific procedures must be followed. Use explosion-proof mechanical ventilation equipment. Recognized API procedures must be used for handling any tank sludges containing caustic material. Prevent leaching of this sludge or the decontamination washings into the subsurface waters.

NAME OF WASTE: FURNACE OIL/STOVE OIL **WASTE DATA SHEET NO.** A-6

(SYNONYM:) (OIL TANK SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See page II-20).

TYPE OF CARRIER: A Provincially licensed and certified vehicle approved for oily sludges.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Many refineries still employ caustic washing and/or Merox fixed bed sweetening for removal of odorous materials. Hydrogen treatment of fuel oils will tend to decrease the amount of sludge for disposal in the future.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming.
- Secure landfill.
- Chemical fixation.

Not Recommended:
- Sanitary landfill.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 80-4 "Canadian Petroleum Refining Industry Waste Survey" 1980.
2. PACE Report 86-2 "Waste Management Guidelines for Petroleum Refiners and Upgraders 1986.

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WASTE DATA SHEET

NAME OF WASTE: JET FUEL "A" TANK BOTTOMS **SHEET NO.** A-7

(SYNONYM) (JET FUEL "A" SLUDGE) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants.

GENERAL DESCRIPTION: Over a long period of time a small amount of sludge may accumulate in a tank bottom.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.8 - 0.85 **SOLUBILITY IN WATER:** Low

APPEARANCE: Grey/black colour **ODOUR:** Characteristic kerosene odour.

COMPOSITION: Mainly rust, sediment and hydrocarbons. No analytical data available in the literature, however, likely to have similar composition to light distillate kerosene.

Hydrocarbons	1-5%
Water	10-15%
Solids	80-85%

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Hydrocarbon phase may contain low aromatic concentration such as benzene and toluene and anti-static additives.

POTENTIAL HAZARDS: Sludge should be treated as any toxic hydrocarbon avoiding skin or eye contact. Unless adherence to procedures for filling a tank is observed an electro-static spark can cause an explosion.

PERSONNEL PROTECTION REQUIRED:

- Wear full impervious protective apparel such as gloves, coveralls, footwear, also eye and facial protection.
- Approved respiratory protection appropriate to the identified health hazards must be worn.
- Good personal hygiene is essential.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Store in covered steel vessels or containers that are properly labelled.

HANDLING: Specific procedures must be followed in confined areas. Explosion-proof mechanical ventiliation equipment is required. Most companies have written procedures for filling tanks with jet fuel for safety reasons. Use non sparking (brass) tools to remove sludge.

NAME OF WASTE: JET FUEL "A" TANK BOTTOMS **WASTE DATA SHEET NO.** A-7

(SYNONYM): (JET FUEL "A" SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed and certified carrier suitable for hydrocarbon sludges.

WAYBILLS REQUIRED: TDGA Federal or Provincial manifest.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Since the end use of jet fuel dictates that this material be treated during manufacture to be free of any kind of contamination, the sludge build-up rate in storage tanks should be low. As a result the frequency of tank sludge removal should not be very great. These sludges should be treated as posing a potential fire, explosion and toxic hazard. Preferred disposal is to return them to the refinery source and dispose of them on a properly engineered land farm.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming.
- Chemical fixation.
- Secure landfill.
- Incineration (with scrubber).

Not Recommended:
- Sanitary landfill.
- Open dump burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

American Petroleum Institute Publication 2015 "Cleaning of Petroleum Storage Tanks".

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WASTE DATA SHEET

NAME OF WASTE: JET FUEL "B" TANK BOTTOMS
(SYNONYM) (JET FUEL "B" SLUDGE)

SHEET NO. A-8
DATE October 1987
REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants

GENERAL DESCRIPTION: Sludges accumulate in bottom of storage tanks and vessels containing naphtha type hydrocarbons. These grey/black sludges accumulate in the bottom of tanks after a number of years of use. These wastes must be removed when the tank is to be entered for repairs or internal servicing.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.72 - 0.85
SOLUBILITY IN WATER: Extremely low
APPEARANCE: Greyish black colour
ODOUR: Characteristic naphtha type

COMPOSITION: Similar to unleaded gasoline sludges i.e.

Water	12%
Solids	45%
Oil	43%

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Following contaminants may be present Phenols, Benzo(a)pyrene and some heavy metals.

POTENTIAL HAZARDS:
Heavy metals and benzo(a)pyrenes are highly toxic. Uncontrolled releases to the environment could cause contamination. Tank bottom sludges may contain pyrophoric materials and could ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:
- Wear full impervious protective apparel such as gloves, footwear, coveralls, eye and facial protection.
- Approved respiratory protection appropriate to the identified health hazard must be worn.
- Maintain good personal hygiene and decontamination equipment after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:
- Store in steel vessels or containers, properly labelled with appropriate steel cover.
- Treat waste as if it were gasoline.

HANDLING: In confined spaces specific procedures must be followed. Use explosion-proof mechanical ventilation equipment. This volatile material poses a fire hazard. Prevent leaching of this sludge, or decontamination "washings", into subsurface waters. Use non sparking (brass) tools for sludge handling.

NAME OF WASTE: JET FUEL "B" TANK BOTTOMS **WASTE DATA SHEET NO.** A-8

(SYNONYM): (JET FUEL "B" SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed or certified closed tank vehicle.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Most of the sludges are removed in the refinery storage tanks but over a period of time might possibly carry over into the Marketing tankage.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming.
- Chemical fixation.
- Secure landfill.
- Incineration with scrubber.

Not Recommended:
- Sanitary landfill.
- Open dump burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 83-2 "The Significance of Trace Substances in Petroleum Industry Sludges Disposed of on Land" 1983.
2. American Petroleum Institute Publication 2015 "Cleaning of Petroleum Storage Tanks".
3. PACE Report 82-1 "Canadian Petroleum Industry Marketing Waste Survey"

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WASTE DATA SHEET

NAME OF WASTE: ADDITIVES - TANK BOTTOMS
(SYNONYM) ADDITIVE TANK SLUDGES

SHEET NO. A-9
DATE October 1987
REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants

GENERAL DESCRIPTION: Although additives are usually added at the refinery, it is sometimes necessary to add them at a marketing installation e.g., if there has been a recent change in formulation.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

MSDS sheets should be consulted for specific composition and properties.

SPECIFIC GRAVITY:	N/A	**SOLUBILITY IN WATER:**	N/A
APPEARANCE:	N/A	**ODOUR:**	N/A

COMPOSITION: May consist of dyes, ignition improvers, anti-icing compounds for gasoline etc. Where blending of lubricating oil is carried out the additives may consist of bearing corrosion inhibitors, Viscosity Index improvers, dyes, Pour-point depressants Oxidation inhibitors and detergents. Lead soaps are commonly used for gear lubricants.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT:
Due to the wide variety of additives used the toxic nature is quite variable. It is prudent to assume additive tank bottoms are toxic with effects ranging from skin irritation to lead toxicity.

POTENTIAL HAZARDS: Avoid contact with skin and eyes. Inhalation of vapours could also be very dangerous. A fire and explosion hazard exists due to presence of hydrocarbons. Tank bottom sludges may contain pyrophoric materials and could ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:
- Wear full impervious protective apparel such as gloves, footwear, converalls, etc. also eye and facial protection.
- Approved respiratory protection appropriate to the identified health hazards on the Specific Material Safety Data Sheet, must be worn.
- Good personal hygiene is essential. Protective equipment must be decontaminated after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:
- Store in conventional steel tanks or vessels.
- Treat waste as if it were gasoline for safety purposes.

HANDLING
- Use explosion-proof ventilation equipment. In confined spaces specific API procedures must be followed.
- Prevent leaching of these sludges, or their decontamination "washings", into subsurface waters.
- Use non sparking (brass) tools for sludge handling.

NAME OF WASTE: ADDITIVES - TANK BOTTOMS **WASTE DATA SHEET NO.** A-9

(SYNONYM :) ADDITIVE TANK SLUDGES

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify Waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed vehicle properly certified for oily sludges.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest required depending on classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Marketing facilities are normally not involved with additives blending, unless for some special reason, such as the decision of a company to put a new additive into their product. Blending and Packaging plants use a number of different additives for lubricating oil formulations. If the plant is large enough the additives will generally be stored in outdoor heated tanks. Sludges and sediments can accumulate in the bottom of these tanks and must be cleaned out and disposed of periodically.

Since additives vary so greatly in chemical composition the advice of Head Office technical personnel should be sought for specifics.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming subject to analysis
- Secure landfill
- Incineration (with scrubber)

Not Recommended:
- Sanitary landfill
- Open pit burning
- Open pit dumping.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: WATER BALLAST - TANK SLUDGE

(SYNONYM) (BALLAST TANK SLUDGE)

SHEET NO. A-10

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Marine Terminals.

GENERAL DESCRIPTION: Ballast Water is associated with marine tanker operations. Ballast water is off-loaded by tankers at Marine terminals in exchange for finished products. Contaminated ballast water (from residues of previous cargo) is stored in ballast tanks and the water is sometimes treated through gravity oil separators. Sludge settles out in the Ballast tank and in the bays of the gravity separators and must be cleaned out periodically.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.93 - 1.05

SOLUBILITY IN WATER: Slight

APPEARANCE: Grey/black colour

ODOUR: Strong hydrocarbon odour

COMPOSITION: Water, sediment, heavy metals, possibly additives and inorganic salts depending on cargo history and ballast water source.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Depends upon source but lead compounds, aromatics such as phenols, cresols, benzene and Polynuclear Aromatics (PNA's) may possibly be present.

POTENTIAL HAZARDS: All of the above are toxic and considered dangerous to inhale or come in skin contact. These sludges should be regarded as explosive and flammable unless they are definitely shown to be otherwise. Sulphide derivatives of iron may also be present. These are pyrophoric and can ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:

- Wear full, impervious, protective clothing such as gloves, footwear and coveralls.
- Eye and facial protection to be worn.
- Approved respiratory protection appropriate to the identified health hazards must be worn.
- Maintain good personal hygiene and ensure protective clothing is decontaminated after each use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- May be stored in closed steel tank or containers that are properly labelled.
- Pyrophoric materials may be present and appropriate fire protection must be considered.

HANDLING:

- In confined spaces specific procedures must be followed. Use explosion-proof mechanical ventilation equipment.
- API tank cleaning procedures must be followed.
- Prevent leaching of the waste sludge or the decontamination "washings" into subsurface waters.
- Use non sparking (brass) tools for sludge handling.

NAME OF WASTE: WATER BALLAST - TANK SLUDGE **WASTE DATA SHEET NO.** A-10

(SYNONYM:) (BALLAST TANK SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed and certified carrier for oily waste.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Most provinces require the oil content of ballast water discharged to be below 15 ppm oil. This can usually be met with adequate settling time in the tank or gravity separator. The amount of sludge deposited in Marketing tanks is not usually large since only finished products are being handled and these produce very little sludge compared to crude oil ballast tanks in use at refineries. Very heavy bunker, however, can pose a serious problem as it tends to deposit out in the tank bottom as sludge. Ballast water containing creosote can also cause high levels of phenol-like materials in the effluent.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarm.
- Secure landfill.
- Incineration.

Not Recommended:
- Road dust suppresant.
- Sanitary landfill.
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. **American Petroleum Institute Publication 2015 "Cleaning of Petroleum Storage Tanks".**
2. **IPIECA "Environmental Management of Refineries and Terminals" - Standard Oil Company (Indiana) J.D. Reed (1984).**

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WASTE DATA SHEET

NAME OF WASTE: DRUMS (USED)

(SYNONYM)

SHEET NO. A-11

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations

GENERAL DESCRIPTION: A variety of materials such as solvents, oils, greases are delivered to Marketing facilities in drums. These drums are either of the returnable or non-returnable type. Drums are normally drained but not rinsed by the user unless they are of the non-returnable type.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: N/A

APPEARANCE:

ODOUR:

COMPOSITION: The residue left in the drums will depend upon the original contents. All drums should have correct labelling with appropriate hazard warnings.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Under Alberta legislation, drums larger than 20 litres and containing a large number of specified chemicals are considered hazardous.

POTENTIAL HAZARDS: The hazard will depend upon the contents of the drum. Used drums that are not properly labelled should be considered hazardous until proven otherwise. Drums should be drained to an appropriate treatment system.

PERSONNEL PROTECTION REQUIRED:

- Workers handling drums containing a variety of chemicals either full or empty, should be fully aware of the nature of the contents and the appropriate measures required to handle the drum safely.
- If no information is available, skin and eye protection shall be worn.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Used drums should be stored with covers to prevent collection of rain and snow. Indoor storage is recommended until proper disposition can take place.

HANDLING: Used empty drums should not be left at the place of use. Rinsing before storage is recommended in some cases with the rinse to be disposed of. A cutting torch should never be used on any steel drum that contains chemicals or hydrocarbons even in trace amounts.

Avoid tipping used drums unless they have been rinsed.

NAME OF WASTE: DRUMS (USED) **WASTE DATA SHEET NO.** A-11

(SYNONYM):

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed vehicle approved for waste disposal.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest required dependent on waste hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: This study showed that returnable drums usually go back to a reconditioning plant for cleaning and re-use. At least one facility reported sending non-returnables back to the same source on a pay basis. Plastic drums are now becoming available and these may be recycled back to the supplier.

It is important that the Marketing facility deal with a reputable drum reclaimer to ensure that the drum cleaning operation does not result in potential environmental problems. As a minimum the drum reconditioning facility should be under permit or license with the Provincial Environmental Agency.

DISPOSAL GUIDELINE:

Acceptable:
- Reclamation and re-use.
- Non-returnable used drums should be cleaned, crushed and disposed of according to approved procedures.
- Re-use for waste storage.

Not Recommended:
- Selling or giving away used drums.
- Open dumping of dirty drums.
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

PACE Report 82-1 "Canadian Petroleum Industry Marketing Waste Survey"

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WASTE DATA SHEET

NAME OF WASTE: GREASE CONTAINERS (USED)

(SYNONYM)

SHEET NO. A-12

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Service Stations.

GENERAL DESCRIPTION: Used grease containers are small steel drums or pails designed to hold approximately 100 lbs. of grease.

"

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY:	N/A	**SOLUBILITY IN WATER:**	Nil
APPEARANCE:	N/A	**ODOUR:**	N/A

COMPOSITION: Containers usually light weight steel and are non-returnable. The grease left-overs will consist of oil 10 - 15%, the remainder lithium, sodium, calcium, aluminum stearate or combinations of these.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Dependent on the type of additive package used in manufacture of grease. Check label for toxic chemicals present and follow precautions on Material Safety Data sheet.

POTENTIAL HAZARDS: Greases are generally alkaline and can cause skin rashes with sensitive people. Burning of grease can release toxic metals into the atmosphere.

PERSONNEL PROTECTION REQUIRED:
- Wear protective clothing such as coveralls and gloves.
- Petroleum naphtha followed by soap and water should be used to wash off any grease which comes into contact with the skin.
- Eye protection must be used when using high-pressure grease guns.

SECTION 4 - HANDLING AND STORAGE

STORAGE:
- Empty drums should be stored in a dry, sheltered location prior to disposal. Do not leave outdoors uncovered.
- Indoor storage is recommended.

HANDLING:
- Manual handling is appropriate provided protective clothing used. (See Section 3).

NAME OF WASTE: GREASE CONTAINERS (USED) **WASTE DATA SHEET NO.** A-12

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Licensed Provincial carrier.

MAYBILLS REQUIRED: TDGA Provincial or Federal manifest dependent on waste hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Non-returnable grease drums are becoming less of a disposal problem in service stations due to the infrequent need for greasing of present day automobiles and trucks. Used drums are frequently cleaned and rinsed for other purposes or crushed and sold for scrap metal.

DISPOSAL GUIDELINE:

Acceptable:
- Clean according to approved procedures and use for waste storage. Rinsings should be collected in a designated drum and held for special disposal.
- Crush cleaned out drums and sell as scrap.
- Reclaim and reuse.
- Clean and dispose in sanitary landfill.

Not Recommended:
- Open pit burning.
- Open dumping of dirty containers.
- Selling or giving away used drums.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: HERBICIDE CONTAINERS (USED) **SHEET NO.** A-13

(SYNONYM) (AGRICULTURAL CHEMICALS) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations

GENERAL DESCRIPTION: Herbicides find application for weed and vegetation control in all marketing sectors. Sprays are usually applied by contractor or owner/agent/lessee of the Marketing operation to tank farm dykes and compounds. Containers for herbicides are either in metal or plastic drums or smaller containers.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY:	N/A	**SOLUBILITY IN WATER:**	Variable
APPEARANCE:	N/A	**ODOUR:**	N/A

COMPOSITION: Metal, cardboard, plastic containers plus residual herbicide active agent. Container labels will have compositional and hazard data.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Herbicides are chemicals designed to kill weeds and are toxic. Some of these materials are organic chemicals while others like soil sterilants, tend to be inorganic chemicals such as sodium chlorate. Herbicides of all forms should be considered as toxic.

POTENTIAL HAZARDS: Depending on the chemicals contained in the herbicide, contact with skin can cause rashes and damage to eyes while inhalation may have long-term adverse health effects.

PERSONNEL PROTECTION REQUIRED:

- Wear full impervious protective apparel such as gloves, footwear, coveralls, etc. as well as eye and facial protection when spraying.
- Approved respiratory protection appropriate to the identified health hazard must be worn.
- Good personal hygiene is essential. Clothing must be decontaminated after each use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Properly labelled containers should be segregated and stored outdoors in a dry sheltered and ventilated place. They should never be discarded with general refuse.

HANDLING: Empty herbicide containers should never be used for storage of any kind of foodstuffs.

NAME OF WASTE: HERBICIDE CONTAINERS (USED) **WASTE DATA SHEET NO.** A-13

(SYNONYM:) (AGRICULTURAL CHEMICALS)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Dependent on Herbicide

TDGR CLASSIFICATION: Check Material Safety Data Sheet (MSDS) for classification.

TYPE OF CARRIER: Provincially licensed and certified carrier.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: The PACE 1982 survey of Marketing facilities found that herbicide containers are generally removed by the sprayer/contractor. The use of contract sprayers using specialized trucks has largely replaced the old method of localized batch mixing and application. Regulatory agencies have expressed concern about the proper disposal of herbicide and pesticide containers.

DISPOSAL GUIDELINE:

Acceptable:
- Return of containers to supplier for reclamation.
- Disposal at approved site.

Not Recommended:
- Sanitary landfill.
- Open pit burning.
- Incineration.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

PACE Report 82-1 "Canadian Petroleum Industry Marketing Waste Survey" June 1982.

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WASTE DATA SHEET

NAME OF WASTE: CONTAMINATED SOIL/ABSORBENTS (SPILLS AND LEAKS)

(SYNONYM)

SHEET NO. A-14

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations

GENERAL DESCRIPTION: Oil contaminated soil occurs due to spills around loading racks, leaking above ground and underground tanks and highway truck spills. Depending on the size of spill and type of fuel spill the hydrocarbon content may be quite high.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: Function of material spilled. Usually quite low.

APPEARANCE: Brown/Black

ODOUR: Typical hydrocarbon odour

COMPOSITION: Oil content may range from 2% - 98%.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Depends upon type of oil absorbed. Leaded gasoline contaminated soil can be very hazardous. Possible contaminants include a range of heavy metals, light and heavy aromatic fractions such as polynuclear aromatics.

POTENTIAL HAZARDS: Specific to nature of hydrocarbons spilled. Presence of organic lead compounds, or aromatics such as benzene, could pose special hazards and require special treatment.

PERSONNEL PROTECTION REQUIRED:
Unless the contaminant in the soil is known to be non-hazardous, workers should assume the worst case and

- wear full impervious protective apparel such as gloves, footwear, coveralls and also eye and facial protection
- approved respiratory protection
- good personal hygiene is essential. Protective clothing and equipment must be decontaminated after use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Although steel or concrete vessels are usually adequate, proper storage will depend upon the nature of the spilled material.

HANDLING Safety precautions depend on the nature of the spilled material. Non-sparking equipment (brass) should be used if volatile hydrocarbons are involved.

NAME OF WASTE: CONTAMINATED SOIL/ABSORBENTS (SPILLS AND LEAKS) **WASTE DATA SHEET NO.** A-14

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20)

TYPE OF CARRIER: Provincial licensed carrier approved for transport of hazardous solid waste.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest required dependent on waste hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: A PACE survey of marketing practices conducted in 1986 identified a number of current practices used for disposal of oil contaminated soil. One facilty spreads the contaminated soil on-site to biodegrade it as in a landfarm. Another sends the waste to a secure landfill, while another facility sends the waste to a non-hazardous waste site if squeezing the waste indicates that it contains less than 5% oil. If it does not pass the "squeeze test" it is spread and dried on-site. Due to the large number of underground storage tanks being replaced, contaminated soil disposal is becoming a bigger problem. If the soil contains lead then weathering must be considered prior to disposal. See Leaded Gasoline - Tank Bottoms, Waste Data Sheet A-1.

DISPOSAL GUIDELINE:

Acceptable:
- Approved in-situ treatment, such as vapour extraction, air stripping, biodegradation.
- Landfarming after analysis for heavy metals such as lead.
- Incineration.
- Secure landfill.

Not Recommended:
- Sanitary landfill without written approval from appropriate regulatory authorities.
- Open dumping.
- Abandonment on site.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

PACE Report No. 86-2 "Waste Management Guidelines for Petroleum Refiners and Upgraders.

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PART I

WASTE DATA SHEET (WDS) INDEX

B SERIES - FACILITIES/PROCESS WASTE

WDS NO.	NAME OF WASTE	SYNONYM	DATE ISSUED/ REVISED
B-1	Above Ground Tanks and Lines (Scrap)	--	October 1987
B-2	Underground Tanks and Lines (Scrap)	--	October 1987
B-3	Car and Truck Washings Waste Water and Silt	Car Wash Blow Down	October 1987
B-4	Oily Water Gravity Separator Sludge	Interceptor Sludge	October 1987
B-5	Storm Water Interceptor	--	October 1987
B-6	Sanitary Waste - Septic Tank Sludges and Liquids	--	October 1987
B-7	Waste Clays From Filters	--	October 1987

PACE

WASTE DATA SHEET

NAME OF WASTE: ABOVE GROUND TANKS AND LINES **SHEET NO.** B-1

(SYNONYM) SCRAP **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants.

GENERAL DESCRIPTION: Above ground tanks are generally found in all Marketing sectors with the exception of Service Stations. Should these tanks develop a leak they are generally emptied, gas freed and repaired. Occasionally a tank will be dismantled and scrapped. The disposal of these scrapped tanks is the subject of this Waste Data Sheet.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A **SOLUBILITY IN WATER:** N/A

APPEARANCE: N/A **ODOUR:** Typical gasoline or hydrocarbon odour.

COMPOSITION: Tanks and piping are steel but the pore structure of the metals will be contaminated with such toxic materials as lead, manganese and heavy aromatics.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Lead, dyes and other toxic contaminants will be present in the pores of the metal even after the sludge has been removed. Heating of the metal for "hot work" will greatly increase the risk of exposure to these contaminants.

POTENTIAL HAZARDS: Unless gas freed there is always danger of fire or explosion. These tanks must never be sold for storage of any kind of foodstuffs even if cleaned.

If tanks or lines ever contained leaded products special procedures must be followed to prevent health hazards.

PERSONNEL PROTECTION REQUIRED:

- Assuming the tanks and piping have been cleaned for sludge removal and gas freed, workers should wear protective clothing such as gloves and coveralls.
- Approved respiratory equipment should be used during cutting operation.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- The tank and contaminated piping must be moved to a safe location. However, the marketing operator must assure himself that the Ministry of the Environment appoves of the site and the ultimate disposal method used by the contractor.

HANDLING : If the tank has been leaking and contained leaded gasoline, special care must be taken to handle the contaminated soil in the area in accordance with WDS A-14. The tank should be clearly marked to the effect that it has contained "leaded gasoline".

NAME OF WASTE: ABOVE GROUND TANKS AND LINES **WASTE DATA SHEET NO.** B-1

(SYNONYM :) (SCRAP)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Demolition scrap carrier

WAYBILLS REQUIRED: None

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Above ground tanks are generally not dismantled as frequently as underground tanks due to corrosion. However, smaller tanks could be replaced by larger volume ones. When this happens extreme care must be taken to ensure that these smaller tanks are not sold or transferred to other services such as farm grain or feed storage, if the tank had been previously in leaded gasoline service.

DISPOSAL GUIDELINE:

Acceptable:
- Storage tanks and lines that are to be removed or dismantled must be thoroughly cleaned, gas freed and this work should be carried out by an approved contractor.
- Disposal should involve recycling to a metal scrap dealer.

Not Recommended:
- Sanitary landfill unless cleaned, crushed and buried.
- Transfer to local farmers for feed or grain storage.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report No. 86-2 "Waste Management Guidelines for Petroleum Refiners and Upgraders", 1986.

2. API Publication 2015A "Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning", June 1982.

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WASTE DATA SHEET

NAME OF WASTE: UNDERGROUND TANKS AND LINES (SCRAP) **SHEET NO.** B-2

(SYNONYM) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants and Service Stations.

GENERAL DESCRIPTION: Underground tanks are generally found in Service Stations but can also be located in other Marketing facilities for providing fuel to carriers. Internal and external corrosion of these tanks and associated piping can occur and requires excavation and disposal. Tanks are generally made of steel, however, latest designs include fibreglass construction.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: N/A

APPEARANCE: N/A

ODOUR: Typical gasoline or hydrocarbon odour.

COMPOSITION: Tanks and piping are steel or fibreglass but the pore structure of the metal and plastic may be contaminated with such toxic material as lead, manganese and heavy aromatics.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Lead, dyes and other toxic contaminants may be present in the pores of the metal even after the sludge has been removed. Heating of the metal for "hot work" would greatly increase the risk of exposrue to these contaminants and should be done only under controlled conditions..

POTENTIAL HAZARDS: Unless gas freed there is always danger of fire or explosion. These tanks must never be used for storage of any animal feed or foodstuffs even if cleaned.

If tanks or lines contained leaded products special procedures must be followed to prevent health hazards.

PERSONNEL PROTECTION REQUIRED:

- Assuming the tanks and piping have been cleaned for sludge removal and gas freed, workers should wear protective clothing such as gloves and coveralls.
- Approved respiratory protection should be used during cutting.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- The contractor generally removes the tank and contaminated piping. However, the Marketing operator should assure himself that the Ministry of the Environment approves of the site and the ultimate disposal method used by the contractor. Some provinces have specific regulations relating to storage and disposal.

HANDLING: If the tank has been leaking and contained leaded gasoline, special care must be taken not to come in contact with contaminated soil in the area. The tank should be clearly marked to the effect that it has contained leaded gasoline. Use non sparking (brass) tools for sludge removal.

NAME OF WASTE: UNDERGROUND TANKS AND LINES (SCRAP) WASTE DATA SHEET NO. B-2

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Demolition scrap carrier.

WAYBILLS REQUIRED: None.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: The PACE 1986 marketing survey found that approved contractors were invariably used to remove leaking underground tanks and lines. The study also found that the services of the company's Engineering Department are requested whenever operations of this kind are carried out. It must be kept in mind that a tank has been in leaded gasoline service can never be cleaned sufficiently, even with sand blasting, to permit safe storage of any kind of liquid or solid animal or human food. Unused tanks should not be left in the ground without gas freeing. In addition, man, provinces prohibit abandonment in place. Regulations should be consulted.

DISPOSAL GUIDELINE:

Acceptable:
- Removal of tanks by approved contractor, thoroughly drained, cleaned, gas freed and cut into scrap for recycling to a steel mill.
- In certain cases refineries might be able to re-use scrap piping.

Not Recommended:
- Sanitary landfill of contaminated vessels and lines.
- Transfer to local farmers for edible or potable products.
- Abandonment in situ.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 82-3 "Underground Tank Systems Review of State of the Art and Guidelines" 1983.
2. PACE Report 86-2 "Waste Management Guidelines for Petroleum Refiners and Upgraders" 1986.
3. API Publication 2015A "Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning" June 1982.

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WASTE DATA SHEET

NAME OF WASTE: CAR AND TRUCK WASHINGS WASTE WATER AND SILT

(SYNONYM) CAR WASH BLOW DOWN

SHEET NO. B-3

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Service Stations

GENERAL DESCRIPTION: Many Marketing facilities have automatic and manual washing facilities for trucks and cars. Sludges accumulate in the interceptor and must be removed periodically. Even though some of the wash water may be recycled a certain percentage must be disposed of.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: N/A

APPEARANCE: N/A

ODOUR: Waxy detergent odour

COMPOSITION: Water phase will contain salt, fine sand particles, some traces of oil, detergents and liquid waxes. The sludge will consist of sand, zinc from the undercoating and rust from car bodies.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Significant levels of zinc have been identified in the sludge from the separators of interceptors of car wash facilities.

POTENTIAL HAZARDS: Sludges contain high concentrations of road salts and abrasives, which may be an irritant on direct contact.

PERSONNEL PROTECTION REQUIRED:

- Wear coveralls, gloves and eye protection when handling sludges.
- Good personal hygiene is essential.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Steel or concrete tanks or vessels are suitable for storage of car/truck washing sludges.

HANDLING Usually removed by vacuum truck by an approved contractor from separator or interceptor.

NAME OF WASTE: CAR AND TRUCK WASHINGS WASTE WATER AND SILT **WASTE DATA SHEET NO.** B-3

(SYNONYM:) (CAR WASH BLOW DOWN)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: N/A

WAYBILLS REQUIRED: Transportation of Dangerous Goods Provincial or Federal manifest dependent on waste classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Automatic washes generally use recycled water to which biodegradable detergents have been added. The recycled water goes into a pit where the solids are settled out. The next stage is a clean water rinse to which liquid wax may or may not be added. Finally a blast of air removes excessive water from the vehicles. Detergents tend to emulsify hydrocarbons present. After settling water generally overflows to the municipal sewer system.

Municipalities such as the Montreal Urban Community (MUC) have passed legislation specifying design and performance standards for interceptors in service stations.

DISPOSAL GUIDELINE:

Acceptable:
- Secure landfill (sludge)
- Chemical fixation
- Landfarming (subject to analysis of sludge)
- Sanitary landfill (subject to analysis of sludge).

Not Recommended:
- Open pit dumping

NOTE:
In the event a marketing facility is located in a remote area, where appropriate sludge treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. Most large urban communities have passed by-laws restricting waste water quality entering the sewer system. e.g. Montreal Urban Community By-Law #87.

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WASTE DATA SHEET

NAME OF WASTE: OILY WATER GRAVITY SEPARATOR SLUDGE **SHEET NO.** B-4

(SYNONYM) (INTERCEPTOR SLUDGE) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations.

GENERAL DESCRIPTION: Gravity separators or interceptors are designed to remove sediment and oil from water at various Marketing facilities. Oily sediment that collects in the bottom of the interceptor must be removed periodically if the interceptor is to function properly. At terminals, bulk plants as well as blending and packaging plants a number of drainage points and sewer lines may go to the interceptor.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 1.05 - 1.2 **SOLUBILITY IN WATER:** Low

APPEARANCE: Black oily material **ODOUR:** Strong hydrocarbon odour

COMPOSITION: The sludge may contain sand, traces of oil and heavy metals such as lead and zinc. The effluent water in a modern 3-stage interceptor system will probably have less than 30 ppm of oil dependent upon the frequency of floor washing and detergents used.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Heavy metals such as lead and zinc and light aromatic hydrocarbons with a possibility of Polynuclear Aromatic hydrocarbon (PNA's).

POTENTIAL HAZARDS: Gravity separator sludges are classified as hazardous under the Federal Transportation of Dangerous Goods regulations and the Ontario Waste Management regulations. Vapours in the interceptors are probably in the explosive range. Sulphide derivatives of iron may also be present. Such materials can ignite spontaneously.

PERSONNEL PROTECTION REQUIRED:

- When removing oily sludge manually, full impervious proctective clothing such as gloves, coveralls, footwear, should be worn. Similar care should be taken when skimming off floating oils.
- Eye and facial protection are required.
- Maintain good personal hygiene and ensure protective equipment is decontaminated after each use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Properly labelled steel tanks or vessels for oil sludge.

HANDLING: Usually removed by vacuum truck and approved contractor. Non-sparking tools (brass) must be used if clean out work carried out manually.

NAME OF WASTE: OILY WATER GRAVITY SEPARATOR SLUDGE **WASTE DATA SHEET NO.** B-4

(SYNONYM:) (INTERCEPTOR SLUDGE)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): 9377 **TDGR CLASSIFICATION:** 3.1

TYPE OF CARRIER: Provincially licensed and certified carrier such as a vacuum truck.

WAYBILLS REQUIRED: Transportation of Dangerous Goods Provincial manifest required.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: It has been estimated by PACE that 65% of all service stations have interceptors. In Quebec the design is prescribed for new installations and performance standards set. In Montreal the maximum oil in the discharge is 30 ppm to the sanitary sewer system and 15 ppm to the storm water sewer. Although the industry uses 1, 2 and 3-stage interceptor systems Quebec has mandated a single large vessel providing about 120 minutes retention time. A PACE study showed that total oil emissions do not exceed 0.1 kg/day average. The best design is claimed to be a 3-stage unit with 80 minutes retention time. Each operator and supervisor should make himself familar with local legislation restricting effluent quality.

To ensure proper operating efficiency most companies do regular checks and clean out the separators if the following are exceeded:

o 6 - 12 inches of sludge in the first or second stage of the separator.
O 2 - 4 inches of oil in the first stage separator.

Sludges from these systems must be cleaned out at a minimum of 12 month intervals to ensure proper operation of the interceptor.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming.
- Secure landfill.
- Chemical fixation.

Not Recommended:
- Open dump burning.
- Open pit dumping.
- Road spreading.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

Monteal Bylaw #87 "Waste Water Disposal in Sewer Systems and Waterways".
PACE Report 82-2 "Study on Service Station Effluents" June 1982.
Ontario Environmental Protection Act (R.S.O.1980) Regulation (0.309)

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WASTE DATA SHEET

NAME OF WASTE: STORM WATER INTERCEPTOR

(SYNONYM) (CONTAMINATED SILT)

SHEET NO. B-5

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations.

GENERAL DESCRIPTION: Storm water falling on potentially contaminated paved surfaces and impervious soil is often directed to a storm oily-water separator (interceptor) or pond prior to discharge to a storm sewer.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: Low

APPEARANCE: Dull grey/black colour

ODOUR:

COMPOSITION: Site specific but mostly consists of fine sand particles, small amounts of oil and organic matter.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Very site specific and depends on previous history of product spills and general housekeeping practices. Contaminants could possibly include traces of gasoline, fuels and additives.

POTENTIAL HAZARDS: None identified in the literature for petroleum marketing operations. It would be safe to assume similar hazards as cited for Petroleum refineries including various hydrocarbons and possibly heavy metals.

PERSONNEL PROTECTION REQUIRED:

- Wear full, impervious, protective apparel such as gloves, footwear, coveralls, etc.
- Eye and facial protection should be worn.
- Approved respiratory protection appropriate to the identified health hazards must be worn.
- Maintain good personal hygiene and ensure protective equipment is decontaminated after each use.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Water may be impounded in a low area and then released at a controlled rate or it may be diverted to an adjacent refinery.

HANDLING: The silt is generally removed from interceptors or ponds on a contract basis using light machinery or a vacuum truck.

NAME OF WASTE: STORM WATER INTERCEPTOR **WASTE DATA SHEET NO.** B-5

(SYNONYM:) (CONTAMINATED SILT)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed vacuum truck or equivalent carrier.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: This study found that most facilities discharge their storm water directly to the local municipal system. In rural areas where no such sewers exist, the water goes to the lowest natural point in the area. The oil content of the silt is so low that no disposal problem is normally present. The maximum permissible level of oil in rain water is usually 15 ppm. It is normally not permitted to discharge storm water into the sanitary sewer system of a municipality.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming.
- Chemical fixation.
- Landfilling (secure or sanitary).

Not Recommended:
- Local dumping could cause odours.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 81-5A "Landspreading of Sludges at Canadian Petroleum Facilities" 1981.
2. PACE Report 86-2 "Waste Management Guidelines for Petroleum Refiners and Upgraders" 1986.

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WASTE DATA SHEET

NAME OF WASTE: SANITARY WASTE - SEPTIC TANK SLUDGES AND LIQUIDS **SHEET NO.** B-6

(SYNONYM) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations.

GENERAL DESCRIPTION: Over a period of time sludges accumulate in the bottom of septic tanks. These sludges must be removed periodically to ensure continued operation of the septic tank system.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: Sludge 1.0 - 1.05 **SOLUBILITY IN WATER:** Low

APPEARANCE: Grey/black colour **ODOUR:** Malodorous

COMPOSITION: Mainly organics sediment and water.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Hydrogen sulphide in the vapour space or dissolved in the sludge.

POTENTIAL HAZARDS: Cleaning of septic tanks can expose personnel to pathogenic bacteria which could cause illness. No open flame should be used inside a tank unless it has been gas freed. Hydrogen sulphide is rapidly fatal if inhaled at even moderate concentrations.

PERSONNEL PROTECTION REQUIRED:

- Wear full protective clothing such as gloves, footwear coveralls, as well as facial protection.
- Wear approved respiratory protection equipment appropriate to the identified health hazard.
- All contaminated clothing must be decontaminated by washing with strong detergents.
- Good personal hygiene is essential.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Steel or concrete vessels properly labelled.

HANDLING: Usually by mechanical means. The preferred method is to use a vacuum truck to remove all liquid and sludge from the tank. If it is necessary to enter a septic tank for specific procedures for entering confined spaces must be followed. Air monitoring should be done and mechanical ventilation should be used.

NAME OF WASTE: SANITARY WASTE - SEPTIC TANK SLUDGES AND LIQUIDS **WASTE DATA SHEET NO.** B-6

(SYNONYM):

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Provincially licensed and certified vacuum truck suitable for septic tank sludges.

WAYBILLS REQUIRED: Not required.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: When there are no municipal sewers available to accept sanitary wastes, septic tanks are commonly used. Bacteria digest the wastes almost totally, however, some undigestible material may be present and this will remain in the bottom of the tank. A scum consisting of hydrocarbons such as grease will also form on the liquid surface.

DISPOSAL GUIDELINE:

Acceptable:
- Clean out sludges by commercial vacuum truck licensed to dispose of waste in municipal landfills.
- Sanitary landfill.

Not Recommended:
- Dumping of septic tank waste on open field.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

MUC By-law #97 "By Law Respecting Waste Water Disposal in Sewer Systems and Waterways".

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WASTE DATA SHEET

NAME OF WASTE: WASTE CLAYS FROM FILTERS

(SYNONYM)

SHEET NO. B-7

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Blending and Packaging Plants.

GENERAL DESCRIPTION: Oil in Blending and Packaging Plants is often filtered using a fuller's earth clay filter media to remove impurities and colour bodies. Spent clay must be removed and disposed of.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.5 - 0.56

SOLUBILITY IN WATER:

APPEARANCE:

ODOUR:

COMPOSITION: A number of clays are used for absorbing impurities, these include fuller's earth, bentonite, and activated alumina. Fuller's earth is the most popular with a composition made up of SiO_2, 48-73%, Al_2O_3 2-15%, Fe_2O_3 1-5%, also small amounts of FeO, MgO, CaO, Na_2O and K_2O.

Spent clay will contain lube oil and the removed contaminants.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Depends upon nature of feestock being filtered. May contain asphaltic and resinous material such as polynuclear aromatics.

POTENTIAL HAZARDS: None identified with lube oils other than those normally associated with hydrocarbons. Care should be exercised to prevent fire.

PERSONNEL PROTECTION REQUIRED:

- Wear full impervious protective clothing such as gloves and coveralls.
- Maintain good personal hygiene.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Store in steel drums or equivalent vessels properly labelled.

HANDLING: No particular precautions as long as waste clay is treated like any other heavy hydrocarbons. Prevent leaching of spent clays into subsurface waters. If clay has been used for volatiles filtration, non sparking (brass) tools must be used for handling.

NAME OF WASTE: WASTE CLAYS FROM FILTERS WASTE DATA SHEET NO. B-7

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Provincially approved carrier for solid waste.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending upon hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: The 1986 PACE marketing survey indicated that this waste generally goes to landfill. The total volume of this waste from marketing operations across Canada is probably very small. Methods of disposal are similar to those in refineries where the volume is much greater.

DISPOSAL GUIDELINE:

Acceptable:
- Landfarming.
- Incineration before sanitary landfilling.

Not Recommended:
- Sanitary landfill.
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. API "Manual on Disposal of Refinery Wastes" Volume III.
2. PACE Report 80-4 "Canadian Petroleum Refining Industry Waste Survey" 1980.

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PART I

WASTE DATA SHEET (WDS) INDEX

C SERIES - AUTOMOTIVE WASTE

WDS NO.	NAME OF WASTE	SYNONYM	DATE ISSUED/ REVISED
C-1	Motor Oils (Used)	Used Crank Case Oil	October 1987
C-2	Transmission Oil (Used)	--	October 1987
C-3	Brake Fluids (Used)	--	October 1987
C-4	Anti Freeze (Used)	Ethylene Glycol or Permanent Anti Freeze	October 1987
C-5	Batteries (Used)	Scrap Batteries	October 1987
C-6	Brake Shoes (Used)	--	October 1987
C-7	Auto Parts (Used)	--	October 1987
C-8	Tires (Used)	--	October 1987
C-9	Obsolete Stock	--	October 1987

PACE

WASTE DATA SHEET

NAME OF WASTE: MOTOR OILS (USED)

(SYNONYM) (USED CRANK CASE OIL)

SHEET NO. C-1

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Service Stations.

GENERAL DESCRIPTION: Crankcase Oil drainings from cars or trucks are black viscous fluids that generally produce a sludge that settles out on standing in drums or tanks.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.9 - 0.95

SOLUBILITY IN WATER: Slight

APPEARANCE: Black

ODOUR: Burnt hydrocarbon odour

COMPOSITION: Mainly hydrocarbons but will contain all or some of the following: unburned gasoline fractions (3-10%) lead, copper, cadmium, iron, barium, chlorine, bromine, ethylene glycol, oxides of nitrogen.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Lead, copper, cadmium, polynuclear and polyaromatic hydrocarbons. There is always the possibility of PCB's (polychlorinated biphenyls), finding their way into used oils through outside sources.

POTENTIAL HAZARDS: Used oils may be contaminated with light hydrocarbons that produce a low flash point. This presents a fire risk. The American Petroleum Institute has warned that used motor oil has caused skin cancer when applied to the skin of mice.

PERSONNEL PROTECTION REQUIRED:

- Avoid skin contact.
- Wash off as soon as possible with petroleum naphtha followed by soap and water if contact does occur.
- Avoid inhaling fumes.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Store in a vented steel, fibreglass or concrete vessel properly identified as such.
- Keep away from open flame.
- Vapour space may be in explosive range.
- Used oil should be kept separate from other hydrocarbon wastes such as waste antifreeze.

HANDLING: Use non-sparking (brass) equipment to avoid ignition or explosion. Smoking must not be permitted around storage vessels.

NAME OF WASTE: MOTOR OILS (USED) WASTE DATA SHEET NO. C-1

(SYNONYM:) (USED CRANK CASE OIL)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed or certified carrier approved for waste oil transport.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Used oil refiners process about 100 million litres per year of waste oil from all sources. Another 65 million litres is thought to be used for road oiling or space heating. Currently there are 6 refiners in Canada who cannot get enough feed stock to operate at peak capacity. Lead contents can make its use for space heating dangerous while oils containing more than 50 ppm PCB's cannot be used for road oiling in most provinces. At least one province (B.C.) has set a maximum PCB concentration of 5 ppm.

DISPOSAL GUIDELINE:

Acceptable:
- Re-refining.
- Incineration (scrubbers).
- Secure landfill.

Not Recommended:
- Use for space heating.
- Sanitary landfill.
- Open pit burning.
- Road oiling as dust suppresant.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: TRANSMISSION OIL (USED)

(SYNONYM)

SHEET NO. C-2

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Service Stations.

GENERAL DESCRIPTION: Automatic transmissions generally require replacement of transmission oil at regular intervals. The transmission oil is usually dyed red to make levels visible. Used transmission oil may produce a sludge that settles out on standing in drums or tanks.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 0.9 - 0.95

SOLUBILITY IN WATER: Slight

APPEARANCE: Brownish-black

ODOUR: Typical hydrocarbon lube oil odour

COMPOSITION: High quality lubricating oil with a high viscosity index and good fluidity at low temperatures. Contains high levels of additives such as viscosity index improvers, dyes, detergents, pour point depressants, anti-oxidation inhibitors and anti-foam agents.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: No data available in the literature but it can be assumed that similar contaminants to used lubricating oil may be present. These could include polynuclear aromatics, heavy metals such as iron, copper, nickel and zinc.

POTENTIAL HAZARDS: Skin contact may cause irritation.

PERSONNEL PROTECTION REQUIRED:

- Rubber gloves, coveralls.
- Wash hands thoroughly with soap and water following contact.
- Good personal hygiene essential.
- Eye protection.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Steel or plastic drums or similar vessels. May be co-mingled with used lubricating oil.

HANDLING: Same precautions as for used lubricating oils.

NAME OF WASTE: TRANSMISSION OIL (USED) **WASTE DATA SHEET NO.** C-2

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed or certified carrier approved for waste oil transport.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Used transmission oils are of lower volume than waste crankcase oils. Since they have a common hydrocarbon base, they can be mixed with crank case oil and sent to an oil re-refinery for reclamation.

DISPOSAL GUIDELINE:

Acceptable:
- Re-refining with used motor oil.
- Incineration (scrubbers).
- Secure landfill.

Not Recommended:
- Use for space heating.
- Sanitary landfill.
- Open pit burning.
- Road oiling as dust suppresant.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: BRAKE FLUIDS (USED) **SHEET NO.** C-3

(SYNONYM) **DATE** October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Service Stations

GENERAL DESCRIPTION: It is customary to replace the hydraulic brake fluid when replacing the brake pads and linings. Used brake fluid is collected and must be disposed of.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 1.02 - 1.07 **SOLUBILITY IN WATER:** High

APPEARANCE: Amber coloured **ODOUR:** Glycol type odour

COMPOSITION: Brake fluid consists of diethylene and polyethylene glycol mono alkyl ethers. It is an amber coloured viscous liquid.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: None identified.

POTENTIAL HAZARDS: May be irritant to skin and eyes. Odour or vapours can be unpleasant. Slight flamability.

PERSONNEL PROTECTION REQUIRED:

- Wash immediately with soap and water if brake fluid comes into contact with skin.
- Use water wash to remove from eyes right away. Get medical attention as soon as possible.
- Rubber gloves and eye protection should be used if there is danger of splashing.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Properly labelled steel drums or vessels are satisfactory.
- Should be segregated in steel drums.

HANDLING Avoid spilling on ground or into sewers as brake fluid is highly water soluble.

NAME OF WASTE: BRAKE FLUIDS (USED) **WASTE DATA SHEET NO.** C-3

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed and certified vehicle for industrial liquid wastes.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on classifications.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Brake fluid should not be mixed with used motor oil.

DISPOSAL GUIDELINE:

Acceptable:
- Recycling and re-use by licensed reclamation plant.
- Incineration.
- Controlled landfarming.
- Controlled injection into bio treater.

Not Recommended:
- Dumping into sewer system.
- Sanitary landfill.
- Open pit burning.
- Mixing with used oil.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: ANTI-FREEZE (USED)

(SYNONYM) ETHYLENE GLYCOL OR PERMANENT ANTI-FREEZE

SHEET NO. C-4

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Service Stations

GENERAL DESCRIPTION: Permanent anti-freeze is in widespread use in truck and automobile cooling systems. From time-to-time it is drained from the radiator of the cooling system and replaced with new rust inhibited anti-freeze.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: 1.05 (1:1 Mix)

SOLUBILITY IN WATER: High

APPEARANCE: Usually green or pink coloured but may be rusty if it has been in long use.

ODOUR: Nil

COMPOSITION: Contains ethylene glycol, diethylene glycol, dye, borax, amine, rust inhibitors. Used anti-freeze will contain iron oxides, aluminum, copper and other products of corrosion.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Ethylene glycol and diethylene glycol are moderately toxic to humans, when exposed to skin, inhaled or ingested.

POTENTIAL HAZARDS: Draining of anti-freeze from an engine at operating temperature (190 -200°F) can be dangerous unless pressure is released gradually. Severe burns can occur.

PERSONNEL PROTECTION REQUIRED:

- Avoid inhalation of fumes when hot or boiling.
- Due to mixture of chemicals present, try to avoid skin contact. If it does occur wash off promptly with soap and water.
- Rubber gloves and coveralls are recommended.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Store in properly labelled steel or plastic drums or tanks.
- Keep segregated from used oils and other liquid wastes.

HANDLING Avoid spills and skin contacts.

NAME OF WASTE: ANTI-FREEZE (USED) WASTE DATA SHEET NO. C-4

(SYNONYM:) ETHYLENE GLYCOL OR PERMANENT ANTI-FREEZE

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Unlisted **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed vehicle.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: There is very little information in the literature on used anti-freeze. Most of it is disposed of either to the municipal sewer systems, dumped on land or is mixed with used oils. The cost of new anti-freeze does not favour glycol recovery. Glycols can be biologically degraded in a biological treatment plant such as a municipal sewage treatment works or a petroleum refinery bio-treater. The main problem when waste glycol is introduced to a bio-treater is one of shock loading, which can destroy the oxygen supply or the equilibrium in the biological reactor. For this reason glycols should be introduced gradually under controlled conditions to such systems.

DISPOSAL GUIDELINE:

Acceptable:
- Incineration under controlled conditions
- Biological treatment under controlled conditions
- Landfarming under controlled conditions

Not Recommended:
- Sanitary landfill
- Open dump burning
- Dumping into municipal sewers
- Mixing with used oils

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

Environment Canada - "Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments" January 1977.
"Guide to Hazardous Chemicals in the Workplace" - N. Irving Sax, Richard J. Lewis, Sr., Van Nostrand Reinhold, New York 1985

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WASTE DATA SHEET

NAME OF WASTE: BATTERIES (USED)

(SYNONYM) (SCRAP BATTERIES)

SHEET NO. C-5

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Bulk Plants, Service Stations, Terminals.

GENERAL DESCRIPTION: Cars, trucks, snowmobiles, boats, motorcycles utilize lead storage batteries. The customer generally expects the seller to dispose of the old used battery.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: Acid - 1.10 to 1.30 **SOLUBILITY IN WATER:** acid highly soluble

APPEARANCE: Clear (Acid) **ODOUR:** Sharp acrid odour (Acid)

COMPOSITION: Case is usually made from a plastic material capable of withstanding sulphuric acid. Battery cells are made from lead compounds in combination with other metals.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Contains sulphuric acid and lead peroxide.

POTENTIAL HAZARDS: In cold state the main hazard is from acid skin burns and permanent eye damage resulting from splashing or spilling of the sulphuric acid. During the charging process, hydrogen which is an extremely explosive gas is emitted, if battery is broken dust from lead compounds will become a health hazard.

PERSONNEL PROTECTION REQUIRED:

- Use proper battery lifter.
- Protect skin with rubber gloves and use eye shields to guard against splashes.
- If acid splashes, wash skin and eyes with plenty of water and obtain immediate medical attention.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Used batteries should be stored upright in areas where acid leaks may be contained.
- Batteries containing acid should not be placed in the general refuse collection bins, as acid skin and eye damage can result to the waste hauler.

HANDLING If the battery is to be moved it should be wrapped in polyethylene to prevent leakage. Due to the hazardous nature of sulphuric acid draining of the battery is not recommended.

NAME OF WASTE: BATTERIES (USED) WASTE DATA SHEET NO. C-5

(SYNONYM:) (SCRAP BATTERIES)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): 2794 **TDGR CLASSIFICATION:** 8

TYPE OF CARRIER: Provincially licensed and certified carrier.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: 93% of all used lead automotive batteries at Marketiing facilities in Canada are sold to scrap dealers for metal recovery (PACE Report 82-1).

DISPOSAL GUIDELINE:

Acceptable:
- Recycling to a used battery reclaimer
- Secure landfill after acid is removed and neutralized safely by addition of baking soda

Not Recommended:
- Sanitary landfill
- Open dumping
- Open pit burning
- Draining of acid to the sewer

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 82-1 "Canadian Petroleum Industry Marketing Waste Survey" June 1982.
2. Ontario Ministry of Environment "Guidelines for the Handling and Disposal of Selected Wastes from Retail Automotive Service Stations" December 1985.

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WASTE DATA SHEET

NAME OF WASTE: BRAKE SHOES (USED)

(SYNONYM)

SHEET NO. C-6

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Service Stations

GENERAL DESCRIPTION: Disc and drum brake linings on trucks and automobiles must be replaced periodically and used linings disposed of.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: Nil

APPEARANCE: N/A

ODOUR: N/A

COMPOSITION: Brake linings used for automotive vehicles contain up to 55% asbestos fibre. This fibre is encapsulated or locked in by various polymers and resins. Some linings include metal particles to improve brake lining wear.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Asbestos and heavy metals.

POTENTIAL HAZARDS: Any residual asbestos dust could be carcinogenic if inhaled into the lungs.

PERSONNEL PROTECTION REQUIRED:

- Wear protective clothing such as coveralls.
- Approved respiratory protection for asbestos should be used.
- Good personal hygiene is essential.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Should be collected and stored in properly labelled steel drums.

HANDLING Avoid creating dust through use of compressed air to clear brake internals. Wet cleaning or vacuuming should be used. Coveralls should be laundered daily.

NAME OF WASTE: BRAKE SHOES (USED) **WASTE DATA SHEET NO.** C-6

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): 2590 **TDGR CLASSIFICATION:** 9.1

TYPE OF CARRIER: Provincially licensed and certified carrier.

WAYBILLS REQUIRED: TDGA Provincial or Federal Manifest.

TRANSPORTATION: Near large urban centres used brake shoes (including linings) are generally segregated and collected by companies specialized in re-claiming the shoes.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Some major oil companies have issued in-house instructions regarding the potential dangers of working in areas contaminated by asbestos dust from brake linings. Studies conducted in the United States and Great Britain have shown that brake lining dust contains less than 5% of free asbestos fibre.(1)

DISPOSAL GUIDELINE:

Acceptable:
- Return old shoes and linings to supplier.
- Sanitary landfill. After placing shoes in heavy plastic bag or a sealed container.

Not Recommended:
- Open dumps.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

(1) "Brake Lining Decomposition Products" - Jeremiah R. Lynch - National Centre for Urban and Industrial Health - APCA Journal, December 1968.
(2) "Fact Sheets" - Asbestos Inforamtion Association, 1660 L St. Washington, D.C. 20036

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WASTE DATA SHEET

NAME OF WASTE: AUTO PARTS (USED)

(SYNONYM)

SHEET NO. C-7

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Service Stations

GENERAL DESCRIPTION: Used auto parts consist of plastic and metallic components such as mufflers, catalytic converters, exhaust and tail pipes, metallic brake parts and other chassis, body, engine and transmission parts.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: Nil

APPEARANCE: N/A

ODOUR: N/A

COMPOSITION: A wide variety of construction materials are used in the manufacture of automotive/truck components and composition will vary depending on the article. Majority of metallic parts contain steel, chrome, nickel, copper, brass or aluminum. Catalytic converters contain low concentrations of platinum on the surface of a ceramic carrier.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Metallic components may contain traces of heavy metals, such as chrome. Used mufflers and exhaust system components could contain lead and lead components originating from use of leaded gasoline.

POTENTIAL HAZARDS: Used mufflers may contain lead compounds and could be dangerous when heat applied. Care should be exercised when dealing with potentially contaminated automotive parts. For example, used muffler system could contain lead and could give off toxic fumes if cutting with welding torch.

PERSONNEL PROTECTION REQUIRED:

- Personnel should wear gloves and coveralls when removing used muffler systems. Mufflers should be removed by air operated impact tools rather than by an acetylene torch. If however, a torch is used to cut the bolts it should be done in a well ventilated area.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Old parts should be stored in a sheltered location dedicated to this purpose.

HANDLING Care needed in handling mufflers to avoid skin and lung contact with lead particles.

NAME OF WASTE: AUTO PARTS (USED) **WASTE DATA SHEET NO.** C-7

(SYNONYM):

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Provincially licensed carrier.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest required depending upon waste hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: The volume of used auto parts from a single marketing facility is not large, making pick-up by a scrap dealer uneconomic except in high volume urban service centres. The trend towards specialized auto repair centres and the marked reduction in the number of retail service station outlets having mechanical repair garages, have reduced the volume of used auto parts requiring disposal from marketing facilities.

DISPOSAL GUIDELINE:

Acceptable:
- Recycle for factory reclamation
- Recycle to scrap dealer
- Secure landfill required only for lead and chromium contaminated scrap

Not Recommended:
- Sanitary landfill unless free of lead and chromium contamination
- Open dump site

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: TIRES (USED)

(SYNONYM)

SHEET NO. C-8

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Service Stations.

GENERAL DESCRIPTION: Generally a service station disposes of used tires removed from cars, trucks and trailers, either through resale or disposal contractor.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: N/A

APPEARANCE: Black

ODOUR: N/A

COMPOSITION: Rubber, carbon, zinc oxide, steel.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: None identified.

POTENTIAL HAZARDS: If tires burned, zinc oxide can be released. Burning tires release dense black smoke that can produce noxious gases.

PERSONNEL PROTECTION REQUIRED: None.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Should be neatly piled in area where fire risk is minimized.

HANDLING: No special requirements.

NAME OF WASTE: TIRES (USED) WASTE DATA SHEET NO. C-8

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER:

NO SPECIAL REQUIREMENTS

WAYBILLS REQUIRED:

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: With the advent of long-life radial tires, the number of used tires from each vehicle has decreased. PACE Report 82-1 Marketing Waste Survey indicates that only 6 - 15% of used tires are recapped, 70 - 90% are scrapped, 0 - 3% used for marine bumpers and 0 - 7% and up in various construction uses.

DISPOSAL GUIDELINE:

Acceptable:
- Reuse for recapping or recycling.
- Marine dock bumpers.
- Reuse in construction.
- Artificial reefs.
- Sanitary landfill.

Not Recommended:
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

PACE Report 82-1 "Canadian Petroleum Industry Marketing Waste Survey" June 1982.

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PACE

WASTE DATA SHEET

NAME OF WASTE: OBSOLETE STOCK

(SYNONYM)

SHEET NO. C-9

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations

GENERAL DESCRIPTION: Marketing operations, from time to time, must get rid of packaging stocks due to product obsolescence. These product lines consist mainly of greases, oils, solvents and specialty product formulations.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER:

APPEARANCE:

ODOUR:

COMPOSITION: Composition will vary greatly depending on the nature of the obsolete product. Read label carefully and follow hazard warnings.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Toxic components are variable depending on chemical composition of obsolete products. Read label carefully and follow hazard warnings.

POTENTIAL HAZARDS: Hazards depend on nature of stocks to be disposed of. Many petroleum marketing stocks are flammable and toxic and extreme care should be utilized to ensure safe disposal. There is danger of explosion if containers containing hydrocarbons are subjected to heat.

PERSONNEL PROTECTION REQUIRED:

- If packaged materials are sealed, a minimum of care is required. However, if larger quantities are handled in open vessels, ensure employees wear full protective equipment including eye and face shields.
- Inhalation of vapours to be avoided at all times.
- If health hazard warrants, approved respiratory equipment to be worn.
- Maintain good personal hygiene.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Steel or plastic vessels, properly labelled.

NAME OF WASTE: OBSOLETE STOCK WASTE DATA SHEET NO. C-9

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): Dependent on nature of products. **TDGR CLASSIFICATION:** Generator to classify waste. (See Page II-20).

TYPE OF CARRIER: Provincially licensed and certified carrier for hazardous waste disposal.

WAYBILLS REQUIRED: TDGA Provincial or Federal manifest depending on hazard classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Obsolete packaged stock may be disposed of in a number of ways such as selling at reduced rates, blending into new products, recycling to the supplier or given away to employees. In general obsolete stock disposal does not present a major waste management problem.

DISPOSAL GUIDELINE:

Acceptable:
- Recycling to supplier.
- Use it in new products.
- Selling for other uses.
- Selling at reduced rates.
- Giving away to employees.

Not Recommended:
- Incineration.
- Sanitary landfill.
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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PART I

WASTE DATA SHEET (WDS) INDEX

D SERIES - MISCELLANEOUS WASTE

WDS NO.	NAME OF WASTE	SYNONYM	DATE ISSUED/ REVISED
D-1	Oily Rags	--	October 1987
D-2	Cans and Bottles (Used)		October 1987
D-3	Food Wastes from Service Station Restaurants	--	October 1987
D-4	General Refuse	Garbage	October 1987

PACE

WASTE DATA SHEET

NAME OF WASTE: OILY RAGS

(SYNONYM)

SHEET NO. D-1

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations

GENERAL DESCRIPTION: Rags are used widely for cleaning up oily equipment, minor product spills, wiping oil and grease off hands prior to washing. Rags can either be of a throw away type or reusable.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY:	N/A	**SOLUBILITY IN WATER:**	Nil
APPEARANCE:	N/A	**ODOUR:**	Hydrocarbon or solvent odour

COMPOSITION: Contaminant composition of liquid absorbed on rags is highly variable ranging from gasoline, solvents, oils, sludges, greases and could possibly encompass all materials handled at the marketing location.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Depends upon the nature of the material mopped up and is highly variable, possibly including additives, lead, zinc and aromatic hydrocarbons.

POTENTIAL HAZARDS: Rags soaked in flammable liquids such as motor oils, gasoline, solvents, oil based points may catch fire very easily. The American Petroleum Institute (API) has warned that used motor oil has caused skin cancer when applied to the skin of mice.

PERSONNEL PROTECTION REQUIRED:
Use protective gloves for handling oily rags. Approved respiratory protection appropriate to the identified health hazard should be used.

SECTION 4 - HANDLING AND STORAGE

STORAGE:
- Can be stored in properly labelled covered metal drums.
- Oily rags saturated with non mineral oils or paints should be spread out to air dry to avoid spontaneous combustion.

HANDLING:
- Avoid prolonged skin contact with any oil or chemical soaked rags.
- Wash hands thoroughly in soap and water after use and before eating.
- Avoid inhalation of vapours from this source.

NAME OF WASTE: OILY RAGS WASTE DATA SHEET NO. D-1

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): 1856 **TDGR CLASSIFICATION:** 4.2

TYPE OF CARRIER: Provincially licenced and certified carrier for hazardous waste disposal.

WAYBILLS REQUIRED: TDGA Provincial or Federal Manifest.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Most Marketing facilities use throw away rags, however, the PACE 1986 survey found one large service station equipped with a proprietary dry cleaning system, to clean and recycle the rags, thereby eliminating the disposal problem. Contracting companies are available that supply clean rags and pick up the soiled ones for recycling on a continuing basis.

DISPOSAL GUIDELINE:

Acceptable:
- In-house dry cleaning system.
- Contract supply, cleaning and recycling service.
- Throw away rags can be incinerated at an approved site.
- Sanitary landfill.

Not Recommended:
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: CANS AND BOTTLES (USED)

(SYNONYM)

SHEET NO. D-2

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations

GENERAL DESCRIPTION: Used cans and bottles of a variety of liquid products.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: Variable

APPEARANCE: N/A

ODOUR: Could be odorous if cans or bottles are open or broken.

COMPOSITION: Steel or aluminum case or glass bottles.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Highly variable depending on residual materials remaining in the containers. Check label for possible hazards.

POTENTIAL HAZARDS:

PERSONNEL PROTECTION REQUIRED:

SECTION 4 - HANDLING AND STORAGE

STORAGE:
- Cardboard cartons for reclaiming by supplier.
- Steel drums.

HANDLING Avoid spills and physical contact as a precautionary measure.

NAME OF WASTE: CANS AND BOTTLES (USED) WASTE DATA SHEET NO. D-2

SYNONYM:

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A TDGR CLASSIFICATION: N/A

TYPE OF CARRIER: N/A

WAYBILLS REQUIRED: N/A

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Bottles can sometimes be recycled to the supplier. Cans may be disposed of by segregating and recycling to a used can reclaimer.

DISPOSAL GUIDELINE:

Acceptable:
- Recycling to supplier.
- Reclamation.
- Sanitary landfill only for empty cans and bottles.

Not Recommended:
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: FOOD WASTES FROM SERVICE STATION RESTAURANTS

(SYNONYM)

SHEET NO. D-3

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Restaurants associated with Service Stations.

GENERAL DESCRIPTION: General food wastes resulting from operation of a restaurant. This includes organic food wastes, waste cooking oils, cans, bottles and plastic containers.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: Variable

APPEARANCE: N/A

ODOUR: Could be unpleasant especially in hot weather.

COMPOSITION: Metals, plastics, organic wastes, scrap cardboard and paper.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Probably low but could possibly contain bacterial or pathogenic organisms.

POTENTIAL HAZARDS: Burning of plastics can emit acid gases such as hydrogen chloride and organic chloride compounds. Salmonella or staphylococus aureus have both been identified in cases of food poisoning and could possibly be present.

PERSONNEL PROTECTION REQUIRED:

- Good personal hygiene is essential.
- Rubber gloves can avoid contact with waste food which could possibly pass on infection if there is a skin break.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Store in plastic or metal containers with closed lids.
- Keep out of sun in cool dry place.

HANDLING Manual handling using appropriate hygiene practices. In most areas commercial contractors will take care of removal and disposal.

NAME OF WASTE: FOOD WASTES FROM SERVICE STATION RESTAURANTS WASTE DATA SHEET NO. D-3

(SYNONYM:)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Licensed Waste hauling vehicle in closed truck or by truck equipped with hydraulic lifter.

WAYBILLS REQUIRED: Usually exempt but could be dependent on waste classification.

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: Most restaurants dump the food wastes into large plastic bags, seal the top and throw into a collection bin or dumpster. Organic wastes not properly packaged and stored are an open invitation to vermin of all kinds (rats and mice), could spread disease, emit foul odours and present an unsightly appearance to customers.

DISPOSAL GUIDELINE:

Acceptable:
- Collection in sealed plastic bags, then placed in covered collection bins for disposal to landfill.
- Incineration in controlled environment.

Not Recommended:
- On-site open pit burning.
- Dumping into non-approved sites.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appopriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

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WASTE DATA SHEET

NAME OF WASTE: GENERAL REFUSE

(SYNONYM) (GARBAGE)

SHEET NO. D-4

DATE October 1987

REV'N NO. 0

SECTION 1 - WASTE INFORMATION

SOURCE: Terminals, Bulk Plants, Blending and Packaging Plants, Service Stations

GENERAL DESCRIPTION: General refuse consists of garbage, lunch room scraps, office trash, cardboard boxes, litter, unusable or unwanted small parts or articles.

SECTION 2 - PHYSICAL/CHEMICAL DATA

PHYSICAL DATA:

SPECIFIC GRAVITY: N/A

SOLUBILITY IN WATER: Variable

APPEARANCE: N/A

ODOUR: Could be offensive in hot weather.

COMPOSITION: Metals of all kinds, paper, glass and organic matter.

SECTION 3 - HAZARD INFORMATION AND PERSONAL PROTECTION

TOXIC COMPONENTS POSSIBLY PRESENT: Generally speaking no toxic materials are present in general refuse, if other materials such as used batteries and oil and grease cans are segregated from this waste.

POTENTIAL HAZARDS: Usually no hazards but if oily paint rags discarded with general refuse spontaneous combusion can occur.

PERSONNEL PROTECTION REQUIRED:

- Good personal hygiene must be practiced.

SECTION 4 - HANDLING AND STORAGE

STORAGE:

- Steel "dumpster" type containers preferably covered.

HANDLING: See Section 3 for handling precautions.

Used batteries, tires, hydrocarbon liquids should not be included in general refuse. Asbestos insulation or ceiling tiles should be segregated and special precautions for asbestos handling should be followed.

NAME OF WASTE: GENERAL REFUSE **WASTE DATA SHEET NO.** D-4

(SYNONYM:) (Garbage)

SECTION 5 - TRANSPORTATION

TDGR IDENTIFICATION NUMBER (PIN): N/A **TDGR CLASSIFICATION:** N/A

TYPE OF CARRIER: Licensed sanitary "dumpster" disposal van.

WAYBILLS REQUIRED: N/A

SECTION 6 - TREATMENT AND DISPOSAL GUIDELINES

BACKGROUND: In most areas across Canada there are reputable refuse collectors who are willing to sign a contract for the removal and disposal of commercial and industrial wastes. The contractor generally supplies a large steel container for refuse, which can be picked up by a specialty truck and hauled away. Where no such service exists, the owner is forced to segregate and dispose of his own refuse. The owner might be held personally liable if he discards any kind of refuse forbidden in the contract which subsequently causes personal injury to handlers or to the environment.

DISPOSAL GUIDELINE:

Acceptable:
- Covered "dumpster" bucket for collection on site, for disposal to sanitary landfill.
- Incinceration in approved facilities.

Not Recommended:
- Open pit burning.

NOTE:
In the event a marketing facility is located in a remote area, where appropriate treatment and disposal systems are not readily available, a secure storage arrangement should be provided until such time as sufficient quantity of waste is accumulated to economically justify shipment to an appropriate treatment and disposal site.

SECTION 7 - SELECTED REFERENCES

1. PACE Report 86-2 "Waste Management Guidelines for Petroleum Refineries and Upgraders" 1986.
2. PACE Report 82-1 "Canadian Petroleum Industry Marketing Waste Survey" 1982.

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PART II

THE WASTE MANAGEMENT CHALLENGE

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THE WASTE MANAGEMENT CHALLENGE

1.0 INTRODUCTION

One of the most important environmental issues to emerge in industrialized countries in the past ten years is the safe disposal of hazardous waste. Canada is no exception, and, as a nation we are beginning to realize the adverse potential impacts which poor waste management practices can produce.

In a recent statement, the Canadian Council of Resource and Environment Ministers (CCREM) said, "In Canada, hazardous wastes are being managed in a manner that could pose a significant danger to public health and the environment. Inadequate and inconsistent application of legislation across the country and the lack of proper disposal facilities have contributed to public dissatisfaction and distrust in the ability of industry and government to deal effectively with the problem."

The petroleum industry has traditionally been in the forefront of meeting environmental and other social challenges. In order to assist the industry to understand the complexity of the issue, and deal effectively with the wastes generated by petroleum marketing operating facilities, it is important that the latest information on the subject be communicated to all marketing facilities across Canada. This manual will play a signification role in meeting that objective.

2.0 LEGISLATIVE OVERVIEW

During the past two years, Canada has seen an acceleration in legislation and regulations dealing with the storage, shipment, treatment and disposal of waste materials. A detailed analysis of the key waste legislation in each jurisdiction, is beyond the scope of this manual. However, this section gives a brief overview of the underlying principles and strategies used by different Government jurisdictions for dealing with wastes based on information collated up to June, 1987.

In Canada the Federal and Provincial governments play major roles in legislating waste handling and disposal. To a lesser extent large municipalities have passed bylaws dealing with certain aspects of waste disposal.

The result of this apparent jurisdictional overlapping is confusion in the minds of many industrial operators as to what laws and regulations apply to the wastes they generate.

The general philosophy for handling hazardous materials adopted in Canada is "cradle-to-grave" controls. This means at all stages of a hazardous material's life cycle, including disposal, safeguards will be employed to protect human health and the environment from damage.

All levels of Government strongly support the use of the 4 R's - i.e. Reduction, Recovery, Reuse and Recycling of wastes, as a first step in trying to reduce the volume of waste generated. Generally speaking Governments are also strong advocates of exchanging wastes between different industries, i.e. one man's "waste" is another man's "feedstock". Exchanges such as the Canada Waste Exchange in Ontario, Manitoba Waste Exchange and the Alberta Waste Exchange are strongly supported by Government.

Canadian petroleum marketing operations take place in all 10 provinces and 2 northern territories. Since shipment of waste often involves provincial and international boundary crossings the Federal Transportation legislation may apply.

Apart from transport the Federal Government does not have direct control of waste from petroleum marketing facilities. Provincial environmental ministries and local municipalities are generally the key agencies that deal with petroleum marketing waste management issues.

The following is a short overview of waste management legislation in Canada:

Federal Government

The Federal Government's main interest is in the movement of hazardous waste from province to province and between Canada, the U.S. and other countries. The legislative authority for this falls under the Transportation of Dangerous Goods Act. The Federal Government under the new proposed Canadian Environmental Protection Act (CEPA), however, may regulate toxic chemical wastes that have a negative impact on public health and the environment. In addition for marketing operations in Northern Canada the Federal Arctic Waters Protection Act and Ocean Dumping Control Act could apply.

Northwest Territories

Waste disposal on Federal land comes under Federal environmental legislation. Territorial lands are covered under the Northwest Territories Environmental Protection Act which is fairly general in nature. Legislation specific to hazardous waste is presently being drafted under a "Hazardous Substances Act". Transport of Hazardous waste is covered by the Territorial equivalent of the Federal Transportation of Dangerous Goods Act.

Yukon Territories

As in the case of the Northwest Territories, there is no specific legislation on waste management in the Yukon. Hazardous wastes are managed under a variety of Federal and Territorial laws including the Ocean Dumping Control Act and Arctic Waters Pollution Prevention Act.

At the present time a study undertaken by a Consultant working under the Federal Department of Indian and Northern Affairs is reviewing legislation for controlling hazardous wastes.

British Columbia

In British Columbia the Waste Management Act and its Regulations provide the Minister with considerable authority for controlling wastes. The Ministry has power to deal with special wastes, spill prevention and response, controls, classification, handling and a waste manifest and tracking system.

B.C. has five regional offices that are authorized to issue waste management permits on behalf of the Ministry.

Alberta

The Hazardous Chemicals Act and its Regulations established a classification system for defining which wastes are hazardous. Controls are exercised over hazardous waste storage, handling and disposal. Tracking of waste is done under a Provincial manifest system compatible with the Federal Transportation of Dangerous Goods (TDG) Regulations.

Saskatchewan

There are no regulations under the Environmental Protection and Management Act of Saskatchewan for hazardous waste management. Such regulations are under consideration at the moment. Proposed regulations however are intended to control the classification, transportation, storage, processing, disposal, reuse and recycling of hazardous waste. There are currently no licensed facilities for treatment and disposal of waste in the Province. Municipal waste management was formerly under the Health Department but has been transferred to the Provincial Environmental Department.

Manitoba

The Manitoba Hazardous Waste Management strategies are in the process of public consultation and review.

The hazardous and special waste program is under development by the environmental management services of that Province.

Regional waste treatment and transfer centres and out of province disposal are considerations that are being addressed in public forums.

Manitoba operates a waste exchange.

The Province of Manitoba is unique in combining legislation governing both Dangerous Goods Transportation and Hazardous Waste Management. Regulations are still to be developed under this Act for waste storage, handling and transport, licensingand manifest systems.

Ontario

Wastes in Ontario come under the Waste Management Regulation (Regulation 309 of the Ontario Environmental Protection Act). This regulation is modelled after the "Blueprint for Waste Management" published earlier, as a public discussion document. The Province emphasizes the application of the "4 R's" - i.e. Reduction, Reuse, Recycling and Recovery as a strategy for industrial, residential and special waste management.

Regulation 309 has a hazardous waste registration requirement, a manifest system and a classification system. Ontario employs a leachate test for determining toxic hazards from solid wastes. Also under this legislation certain wastes are listed as hazardous. This means that the generator does not have to evaluate his waste against certain criteria as it is automatically assumed to be hazardous.

There is a hazardous waste listing committee that make recommendations to the Minister whenever specific wastes are to be listed or de-listed.

Quebec

Quebec has very comprehensive waste management legislation covering storage, handling, transport and disposal. The hazardous waste regulations, under the Environmental Quality Act, issued in 1985, identify permit requirements and other aspects of hazardous waste control and include a listing of hazardous waste materials, criteria for determining hazards including toxicity based on a leachate test.

New Brunswick

The Province of New Brunswick has a hazardous waste management strategy based on the following:

(1) The establishment of a comprehensive and up-to-date inventory of hazardous waste produced.

(2) The development of a management plan that will control wastes from their initial generation through to their ultimate disposal.

(3) Planned public consultation meetings provide background for the identification of all active and inactive waste disposal sites and planning for future work. The Province has developed a philosophy that a well-informed public is a necessary prerequisite to the development of hazardous waste management strategy.

Nova Scotia

Nova Scotia is developing a hazardous waste data base through a manifest system prior to developing a comprehensive control program. At present, waste management control is conducted largely through a permit system.

Prince Edward Island

The Province of Prince Edward Island controls waste management under the Department of Community and Cultural Affairs - Environmental and Technical Service unit. There are no regulations presently for the storage, handling, treatment or disposal of hazardous wastes. The province considers each situation through Ministerial orders on a site specific basis.

Newfoundland

Newfoundland's waste management program covers investigation of historical disposal problems and responding to localized problems on a case-by-case basis. The Province in not at the moment preparing any special regulations for the hazardous waste management issue.

3.0 SAMPLE POLICIES AND PROCEDURES

3.1 Introduction

The principles on which good waste management practices are based are not complex and depend upon both experience and knowledge of environmental hazards. They can be summarized as follows:

(1) Establish a well defined and understood system of responsibilities and accountability for waste management at the plant level.

(2) Provide adequate training for the person(s) responsible for waste management at the site.

(3) Carry out an inventory of all waste materials at the marketing site.

(4) Identify through chemical and physical analysis the nature of the waste stream.

(5) Classify waste into hazardous and non-hazardous categories using Government criteria.

(6) Seek expert advice on treatment, disposal and Government registration requirements where applicable, of hazardous waste that are unfamiliar.

(7) Maintain careful record keeping of all waste handling transactions, including sale or exchanges and ultimate disposal.

(8) Periodically audit waste storage, handling, treatment and disposal systems.

3.2 Back to Basics - "The 4 R's" (Reduction, Re-use, Recycling, Recovery)

One of the fundamental concepts applied to waste management is commonly referred to as the "4R's". The four R's stand for (1) Reduction, (2) Re-use, (3) Recycling and (4) Recovery.

The primary goal of waste management is to reduce the quantity of waste generated to a minimum. Searching out ways of reducing waste streams, reusing or recycling them back into the system or removing valuable components from them, should be the first task undertaken after making a waste inventory.

Only after the application of the "4 R's" have been extensively investigated and exhausted should waste residues be considered for treatment and disposal.

3.3 Policies

Major oil companies all have broad Environmental Policies that form the basis for the setting of goals and objectives for their operations. An example of such a policy is shown in Figure II-1. Policies , however, must be translated into more specific directives when applied to the management of wastes.

Clear-cut understandable policies and procedures are essential for the success of a waste handling program. Short-term solutions are no longer accepted from a social, legal or economic point of view.

Record keeping of all waste transactions is crucial to the success of a waste management program.

A failure to keep adequate records to-day can at some later date involve the company in costly law suits and clean ups.

Many companies have instituted written procedures to define responsibilities and provide control forms for record keeping. Samples of such procedures and record keeping forms are shown for Terminals, Bulk Plants and Service Stations on Figures II - 2, II - 3 and II - 4 (respectively).

These forms can be modified and adapted to suit local site requirements.

FIGURE II - 1

TYPICAL PETROLEUM COMPANY ENVIRONMENTAL POLICY

The Company recognizes the importance of safeguarding the environment wherever it conducts its business. This extends from the production of crude oil and other energy sources through the manufacture and distribution of our products. Therefore, in keeping with the Company's guiding principles and objectives, our environmental policy is:

- To provide environmental training programs for employees, emphasizing operator/lessee responsibility for sound environmental management.
- To maintain corporate and departmental environmental monitoring programs to ensure compliance with the Company's policy and governmental requirements.
- To comply with all environmental laws and regulations.
- To conduct our operations in a manner which demonstrates respect for the quality of the environment.
- To co-operate with all levels of government in analyzing emerging environmental issues, finding solutions to environmental problems and developing cost effective, scientifically based environmental standards.
- To maintain effective environmental procedures and equipment, consistent with available technology.

FIGURE II-2(a)

SAMPLE

DISTRIBUTION TERMINAL PROCEDURE

FOR

CONTROL OF MARKETING WASTE MATERIALS

Procedure #: _____ Effective: _____

Approved by: _____

Purpose:

a. To establish safe handling procedures for the removal, storage and disposal of all liquid and solid waste materials.

b. To ensure all wastes are disposed of in an environmentally acceptable manner which meets or exceeds all regulatory requirements.

c. To provide the necessary documentation to prove to the government and/or the public that our waste disposal practices are not deficient.

d. To clearly define the responsibilities for waste materials control.

Procedure:

1. The facility manager will assign the responsibility for waste handling, storage and disposal to one individual within his plant.

2. The individual assigned the responsibility of controlling marketing waste materials will, under the authority of the facility manager, ensure that all wastes are properly handled so as not to create a nuisance or legal violation in transit or at the disposal site.

3. Guidance from regional or head office environmental personnel must be obtained when in doubt about the best course of action to follow.

4. Wastes suspected of being oily, toxic or hazardous must not be deposited into the environment on-site or off-site without approval in writing from the appropriate regulatory authority.

5. Wastes must not be mixed unless it is known that they are compatible. Leaded wastes require a different disposal mechanism from oily, biodegradable wastes.

6. Wastes suspected of being hazardous, if to be stored, must be secured (ideally in steel containers) and clearly identified.

7. Records of all wastes stored, leaving the plant, or disposed of within the plant must be maintained and reported at least annually to the plant manager (Waste Control form attached).

8. Wastes for disposal must be directed to a Government and Corporate approved site ensuring all necessary precautions and documentation are complete.

FIGURE II-2(b)

SAMPLE

DISTRIBUTION TERMINAL WASTE CONTROL FORM

TERMINAL LOCATION: _____

DATE: _____

SOURCE OF WASTE (i.e. Separator Btms.): _____

TYPE OF WASTE (oily, leaded): _____

EXPECTED VOLUME (bbls., m^3, yds^3): _____

PROPOSED TIMING FOR INITIAL STORAGE/DISPOSAL: _____

_____

PROPOSED STORAGE/DISPOSAL MECHANISM/LOCATION: _____

_____

WASTE QUALITY DATA (i.e. % Solids, Oil, H_2O): _____

_____

ACTUAL VOLUME OF WASTE: _____

ACTUAL STORAGE/DISPOSAL DATE: _____

STORAGE/DISPOSAL LOCATION: _____

TRANSPORTED BY: _____

MANIFEST #: (if off-site) _____

COMMENTS: (i.e. Regional Environmental Personnel Consulted)

_____

_____

_____

FORM COMPLETED BY: _____

FIGURE II-3 (a)

SAMPLE

BULK PLANT PROCEDURE

FOR

CONTROL OF MARKETING WASTE MATERIALS

Procedure #: _____ Effective: _____

Approved by: _____

Purpose:

a. To establish safe handling procedures for the removal, storage and disposal of all liquid and solid waste materials.

b. To ensure all wastes are disposed of in an environmentally acceptable manner which meets or exceeds all regulatory requirements.

c. To provide the necessary documentation to prove to the government and/or the public that our waste disposal practices are not deficient.

d. To clearly define the responsibilities for waste materials control.

Procedure:

1. The facility manager/agent will maintain records of all wastes stored, leaving the facility or disposed of within the facility (Bulk Plant Waste Control form attached).

2. Wastes suspected of being oily, toxic or hazardous must not be deposited into the environment on-site or off-site without notification of regional or head office environmental personnel and approval in writing from the appropriate regulatory authority.

3. Wastes suspected of being oily, toxic or hazardous, if to be stored, must be secured (ideally in steel containers) and clearly identified.

FIGURE II-3 (b)

SAMPLE

BULK PLANT WASTE CONTROL FORM

BULK PLANT LOCATION: _____

DATE: _____

COMPANY ENVIRONMENTAL/MAINTENANCE REPRESENTATIVE CONSULTED: _____

_____

SOURCE OF WASTE (i.e. Diesel Tank Btms,)(Tank #): _____

VOLUME OF WASTE (bbls.,m^3,yds^3): _____

STORAGE/DISPOSAL MECHANISM: _____

_____

_____

STORAGE/DISPOSAL LOCATION: _____

TRANSPORTED BY: _____

MANIFEST #: _____

COMMENTS: (i.e. Regional Environmental Personnel Consulted)

_____

_____

_____

_____

FORM COMPLETED BY:

_____

FIGURE II-4 (a)

SAMPLE

SERVICE STATION PROCEDURE

FOR

CONTROL OF MARKETING WASTE MATERIALS

Procedure #: _____ Effective: _____

Approved by: _____

Purpose:

a. To establish safe handling procedures for the removal, storage and disposal of all liquid and solid waste materials.

b. To ensure all wastes are disposed of in an environmentally acceptable manner which meets or exceeds all regulatory requirements.

c. To provide the necessary documentation to prove to the government and/or the public that our waste disposal practices are not deficient.

d. To clearly define the responsibilities for waste materials control.

Procedure:

1. The station manager will maintain records of all wastes stored, leaving the facility or disposed of within the facility (Service Station Waste Control form attached).

2. Wastes suspected of being oily, toxic or hazardous must not be deposited/discharged into the sewer/environment without notification of company regional personnel and approval in writing from the appropriate regulatory authority.

3. Wastes suspected of being oily, toxic or hazardous, if to be stored, must be secured (ideally in steel containers) and clearly identified.

FIGURE II-4 (b)

SAMPLE

SERVICE STATION WASTE CONTROL FORM

STATION LOCATION: _____

DATE: _____

COMPANY REPRESENTATIVE CONSULTED: _____

TYPE OF WASTE (i.e. Used Antifreeze)(Unleaded Tank Btms.): _____

_____

_____

VOLUME OF WASTE: (bbls.,m^3,yds^3): _____

SOTRAGE/DISPOSAL MECHANISM: _____

_____

_____

STORAGE/DISPOSAL LOCATION: _____

_____

_____

SPECIAL CONCERNS ADDRESSED: _____

_____

_____

TRANSPORTED BY: _____

MANIFEST #: _____

COMMENTS:

_____

_____

_____

FORM COMPLETED BY: _____

Waste Management Plan:

A prudent marketing facility manager or operator will have a well thought out waste management plan.

The overall objective of such a plan is to:

(1) Practice resource conservation and recovery.

(2) Reduce waste disposal cost.

(3) Comply with all regulatory requirements.

(4) Avoid future costly site clean-up during plant site decommissioning.

Such a plan requires a systematic check list approach and is best described pictorially as shown in Figure II-5.

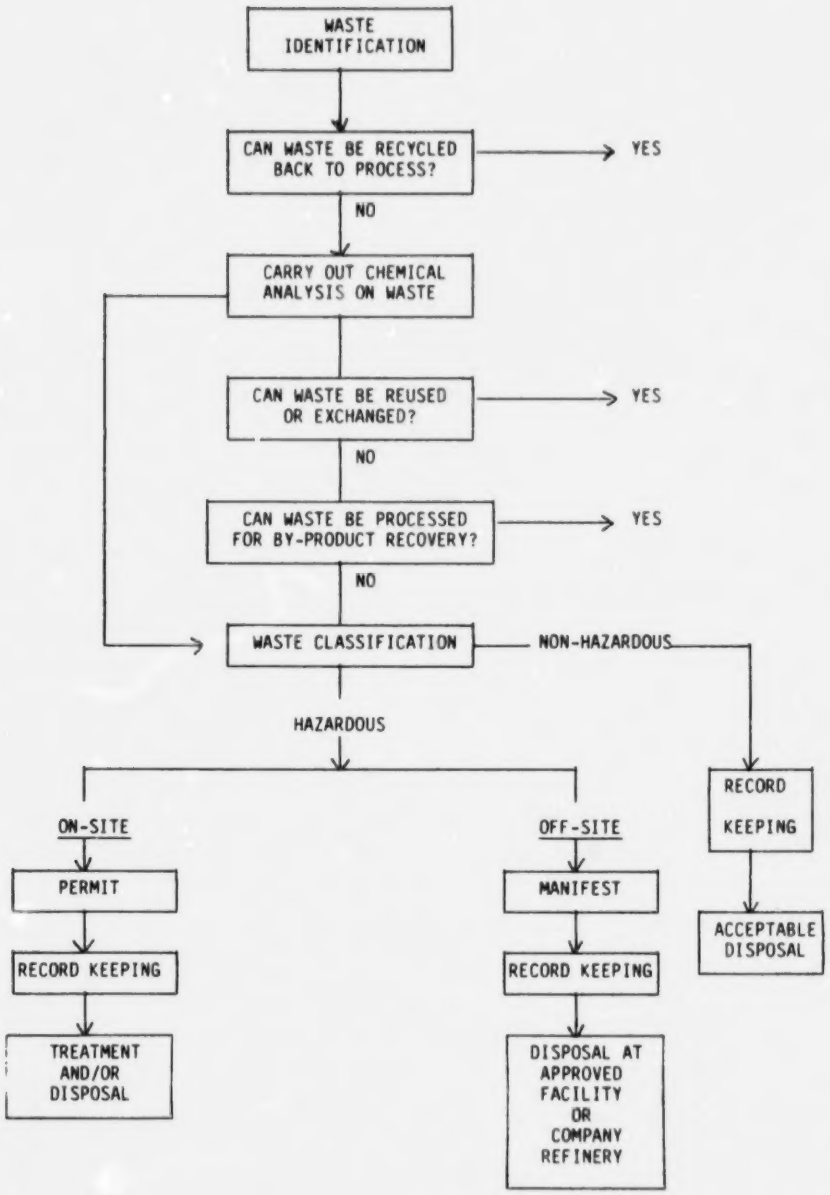
First a listing of all wastes at the marketing site should be made. It should be determined if the waste can be reduced or eliminated, recycled back to the supplier for useful recovery or reclamation. Chemical and physical tests may be necessary to determine if it is hazardous or non-hazardous under government regulatory definitions.

If off-site treatment and disposal is required, then proper shipping (manifesting, placarding and labelling) procedures must be observed. The plant manager should satisfy him or herself that the contractor's treatment and disposal system is adequate and meets the necessary government standards.

In all of the above good record keeping for every link in the transfer chain is a must both for both on-site and off-site disposal.

FIGURE II - 5 WASTE MANAGEMENT PLAN

SCHEMATIC FLOW DIAGRAM



4.0 WASTE CLASSIFICATION

In the management of industrial wastes it is most important to segregate those wastes that are considered hazardous by legal definitions from those that are not considered to be a threat either to human health or the environment.

Criteria have been established for classification of wastes that are not already listed as being hazardous by legislation. Table II-1 identifies petroleum wastes, generally associated with petroleum refining, that are listed under Federal Transport Regulations and by the Province of Ontario under their Waste Management Regulations. A simplified decision tree is shown on Figure II-6 which identifies the logical steps that a facility operator would have to go through in order to classify wastes under his control. A more detailed Table showing the comparison of classification system used in the United States, Canada and a number of Canadian Provinces is included in Appendix 5.

Although legally, a small volume exemption for hazardous wastes is contained in Canadian legislation, (5 kg/shipment under the Federal Transportation of Dangerous Goods Regulation or 5 kg/month for typical provincial waste management regulations), it is recommended that all hazardous wastes regardless of volume be treated as such.

The reader will see at a glance that the determination of hazard classification is not easy. The operator is encouraged to assure himself of the correct classification by (1) using the classification provided in the Waste Data Sheets, (2) contacting his Head Office Specialist or (3) by contacting the regional offices of the provincial ministry of the environment. Most provincial agencies encourage discussion of waste disposal questions and are prepared to provide guidance for waste registration, permits or approvals. A list of agencies and telephone numbers is provided in Appendix 3.

Many provinces have issued booklets describing the responsibilities of waste generators, carriers and receivers of industrial waste.

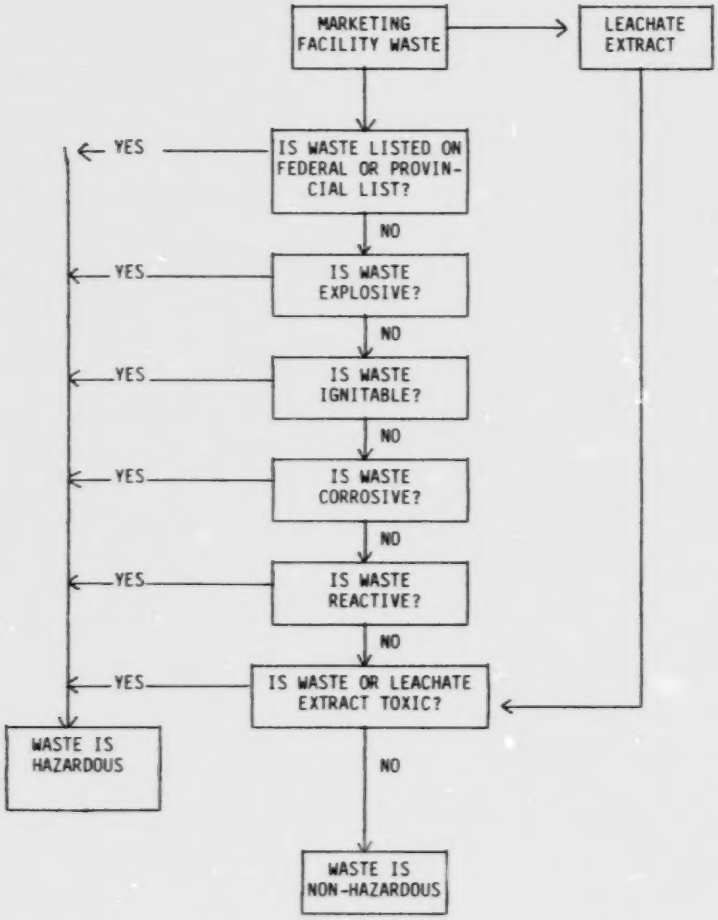
TABLE II-1

EXAMPLES OF PROVINCIALLY AND FEDERALLY LISTED HAZARDOUS WASTES FROM PETROLEUM PLANTS (ONTARIO REGULATION 309 AND FEDERAL TDG REGULATIONS)

WASTE	ONTARIO WASTE NUMBER	FEDERAL TDGR			
		PRODUCT IDENTIFICATION NUMBER (PIN)	WASTE TYPE NUMBER	CLASSIFICATION	PACKING GROUP
API Separator (Interceptor) Sludge	NA9377	9377	77	3.1, 6.1	II
Gasoline Tank Bottoms (Leaded)	NA9378	9378	78	6.1, 4.1	II

FIGURE II - 6 WASTE CLASSIFICATION

DECISION TREE TO BE FOLLOWED TO DETERMINE IF WASTE IS HAZARDOUS OR NOT



5.0 WASTE TRANSPORTATION

In Canada, regulations covering the classification and transport of waste were introduced in 1985, under the Federal Transportation of Dangerous Goods Act. Many of the provinces have developed parallel transport regulations while at the same time some provinces have introduced regulations to deal specifically with handling, transport and disposal of hazardous waste.

Regulations under the Transportation of Dangerous Goods Act relate to the shipment of all dangerous commodities, hazardous waste being only one of a large number. The legislation is designed to cover all forms of transport, i.e. air, rail, highway and marine.

In the case of petroleum marketing most wastes are likely to be shipped by truck, rail car and possibly in some cases by marine. If these shipments are going to cross international boundaries such as the United States/Canada border, differing requirements in terms of labelling, manifesting may be required.

The Canadian Federal Government is at the moment trying to develop an agreement for trans-boundary shipment of wastes using compatible manifest systems.

Under the Canadian transportation legislation the responsibility of the consignor, (i.e. the shipper) is to classify the dangerous goods being transported, (see page II-24). The Transportation of Dangerous Goods Regulations schedules identify materials that are deemed hazardous by virtue of being on a list. Included is a listing of waste materials associated with petroleum operations. The most likely candidate waste from marketing operations on the list are as follows:

(1) Gravity separator (interceptor) sludges.

(2) Leaded tank bottom sludges.

Table II-1 identifies this list of wastes and provides the product identification number (PIN) and Transportation of Dangerous Goods Regulations Classification number.

Since hazardous wastes have to be tracked from "cradle-to-grave" the tracking of these wastes requires that a manifest or waybill be filled in by the consignor, carrier and receiver. A manifest is a shipping document that contains specific information that is useful in case of emergencies such as spills. A sample manifest is shown on pages II-26 and II-27. The manifest form contains information on the quantity of the waste shipped, the name of the firm or individuals initiating the shipment, information on the treatment and storage or disposal of the hazardous waste when it reaches the final destination. The form has three distinct sections to be filled in. The first is the responsibility of the consignor (waste generator), the second is that of the carrier or transporter and the third is that of the consignee (receiver). Six copies are completed and two copies are forwarded to the control agency and file copies retained for a period of two years. A typical distribution of the manifest is as follows:

	Sent To	Sent By/Action
Copy 1	Regulatory Agency	Generator
Copy 2	Generator	(Retains for a minimum of 2 years)
Copy 3	Regulatory Agency	Receiver
Copy 4	Carrier	(Retains for a minimum of 2 years)
Copy 5	Receiver	(Retains for a minimum of 2 years)
Copy 6	Generator	Receiver

Vehicles must be properly placarded and containers must be properly labelled as specified in Part IV of the regulations.

In some provinces vehicles used to transport waste require certificates of approval or licensing, ensuring that they meet the standards of both construction and operation. Driver training, including vehicle operation, waste management legislation, the waste being transported and initial emergency response procedures are all mandatory.

The Canadian Standards Association (CSA) has developed a preliminary standard for pressure vacuum liquid waste tanks and for reinforced plastic highway tanks for the transportation of hazardous commodities. Decision trees to assist in the classification of wastes are available from the appropriate agency. A sample of the Federal one is included in Appendix 5.

Under the rules of the Transportation of Dangerous Goods legislation there are nine classes of dangerous commodities.

Criteria under which the hazardous wastes have been classified are generally imited to the following six:

(1) Explosivity
(2) Ignitibility/Flammability
(3) Corrosivity
(4) Reactivity
(5) Toxicity
(6) Radioactivity

Where a solid waste is encountered, a leachate test, to determine the toxicity of the water extract, is a requirement. Such a test is a useful indicator of a waste's potential for contaminating soil and groundwater.

If the waste is not listed under either Provincial or Federal legislation then it must be tested by the application of specified criteria to see whether it falls into the hazardous or the non-hazardous category. As mentioned earlier, Figure II-6 is a schematic logic diagram illustrating the process for such classification.

In addition, there is a small volume exemption, which means that a waste below a regulated weight or volume (e.g. 5 kg or 5 KL per shipment), is considered non-hazardous even though it meets the regulated hazard criteria, such as toxicity. However, it is prudent, due to the potential collective negative impact of a large number of small waste deposits, to treat all wastes that fall into the hazardous category regardless of volume, as hazardous.

SCHEDULE IV

(s. 4.15, 4.16, 4.17, 4.18)

FORM I

ANNEXE IV

(Articles 4.15, 4.16, 4.17, 4.18)

FORMULE I

A - CONSIGNOR (GENERATOR) EXPÉDITEUR	Provincial No - N° provincial	**B - CARRIER TRANSPORTEUR**	
Company Name - Nom de l'entreprise	Circulation No — N° de circulation	Company Name — Nom de l'entreprise	Provincial No — N° provincial
Address - Adresse		Address - Adresse	
Shipping Site Address - Origine de l'expédition		City - Ville / Prov / Postal Code - Code postal	
City - Ville / Prov / Postal Code - Code postal		Registration immatriculation des véhicules / License No immatriculation / Province	
		Vehicle - Véhicule moteur	
Intended Consignee Destinataire choisi	Provincial No - N° provincial	Trailer #1 - Remorque #1	
		Trailer #2 - Remorque #2	
		Point of Entry Point d'entrée / Point of Exit Point de sortie	
Address - Adresse		Carrier Certification: I declare that I have received the wastes described in Part A for delivery to the intended Consignee Déclaration du transporteur: Je déclare avoir pris livraison des déchets décrits à la partie A afin de les transporter au destinataire choisi	
Receiving Site Address - Destination de l'expédition		Name of Driver (Print) Nom du conducteur (caractères d'imprimerie) / Tel No (Area Code) N° de tél (ind rég)	
City - Ville / Prov / Postal Code - Code postal		Signature	

Physical State (Sol Liq Gaz) / Etat physique (sol liq gaz)	Shipping Name / Appellation réglementaire	Product Identification No N° d'identification du produit: Provincial	TDGA LTMD	Classification	Packing Group / Groupe d'emballage	Quantity Shipped Quantité expédiée	Units L/kg Unités	Concentration	Units (Specify) Unités (spécifier)	Packaging Contenants: No - N^bre	Code (Int/Ext)

Special Handling Emergency Instructions
Manutention spéciale/instructions d'urgence

Attached / Ci-jointes ☐ Below / Plus bas ☐

Shipped - Date d'expédition / Time - Heure / AM ☐ PM ☐ Date (D/M/Y - J/M/A)	Scheduled Arrival Date (D/M/Y) Date prévue d'arrivée (J/M/A)

Consignor Certification: I declare that the information contained in Part A is correct and complete

Déclaration de l'expéditeur: Je déclare que tous les renseignements à la partie A sont véridiques et complets

Name of Authorized Person (Print) Nom de l'agent autorisé (caractères d'imprimerie)	Tel No (Area Code) N° de tél (ind rég)	Signature

FORM 1—Conc. FORMULE 1—Fin

MANIFEST - MANIFESTE

Manifest Reference No
N° de référence du manifeste

Reference No s of Other Manifest(s) used
N°s de référence des autres manifestes utilisés

C - CONSIGNEE (RECEIVER)
DESTINATAIRE

Company Name - Nom de l'entreprise | Provincial No — N° provincial

Address - Adresse

City - Ville | Prov | Postal Code - Code postal

Receiving Site Address — Destination de l'expédition

City - Ville | Prov | Postal Code - Code postal

Received - Réception
Time - Heure AM ☐ PM ☐ Date (D/M/Y - J/M/A)

Quantity Received Quantité reçue		Identify any Shipment Discrepancy/Problems/ Refusal Identifier toute différence entre manifeste et cargaison/ problèmes/refus	Handling Code Code de manutention	Decontamination Decontamination	
	Units L/kg Unités			Packaging Conteneurs Yes Oui / No Non	Vehicle Véhicule Yes Oui / No Non

If Handling Code "Other" (Specify)
Si code de manutention "divers" spécifier

If waste to be re-transferred (specify company name)
Si le déchet doit être re-transféré indiquer le nom de l'entreprise | Provincial No - N° provincial

Address - Adresse | City - Ville | Prov

Consignee Certification: I declare that the information contained in Part C is correct and complete
Déclaration du destinataire: Je déclare que tous les renseignements à la partie C sont véridiques et complets

Name of Authorized Person (Print)
Nom de l'agent autorisé (caractères d'imprimerie)

Tel No (Area Code) - N° de tél (ind rég) | Signature

EMERGENCY TELEPHONE NUMBERS
N°s DE TÉLÉPHONE EN CAS D'URGENCE

Canutec (Call Collect)
Canutec (appeler à frais virés)
(613)-966-6666

Alberta
1-800-222-6514

British Columbia
Colombie-Britannique
(604) 387-5956

Manitoba
(204) 944-4888

New Brunswick
Nouveau-Brunswick
Zenith 4-9000

Newfoundland
Terre-Neuve
(709)-772-2083

Northwest Territories
Territoires du Nord-Ouest
(403)-920-8130

Nova Scotia
Nouvelle-Ecosse
Zenith 4-9000

Ontario

Prince Edward Island
Ile-du-Prince-Edouard
Zenith 4-9000

Quebec
Québec
(418)-643-4595

Saskatchewan
1-800-667-3503

Yukon Territory
Territoire du Yukon
(403)-667-7244

6.0 WASTE TREATMENT TECHNOLOGIES AND DISPOSAL METHODS

6.1 Introduction

Current technology applied to waste treatment and disposal is fairly basic. An understanding of these processes and their limitations is essential for industry personnel involved in the waste management field.

The term "treatment" as used here refers to any activity that eliminates or reduces the volume or hazardous nature of a waste, preparing the waste for disposal. Basically there are three types of treatment available, namely, (1) physical/chemical, (2) thermal and (3) biological. All three are used and will be discussed in this section.

Disposal usually takes the form of "landfill" or "deepwell injection".

Presently, landfilling is generally used for the ultimate disposal of wastes produced by petroleum marketing facilities.

In California under the impetus of tough legislation, the oil industry, through the Western Oil and Gas Association (WOGA), has launched a multi-phase research study to uncover new technologies to supplement or even replace land treatment of oily wastes. Some of the alternatives being researched may prove technically sound, but there is every indication that the costs of these technologies will be high. Source reduction will in future, assume a much greater importance than it has in the past, as a direct result of higher treatment and disposal costs.

This section presents the following treatment technologies and disposal methods:

- Land Treatment (Landfarming)
- Waste Water Treatment Systems
- Oil Recovery from Oily Sludges
- Landfill
- Leaded Gasoline Sludge Disposal
- Incineration
- Deep Well Disposal
- Chemical Fixation

6.2 Land Treatment (Landfarming)

General

Landfarming is a disposal process which utilizes natural soil bacteria to break down oily or biological sludges. Photo-oxidation and volatilization also play a significant role.[1] The bacteria use the organic component of the waste as a food, producing carbon dioxide and additional bacteria cells in the process. Landfarming is also known by other names such as landspreading, soil biodegradation, etc. but should not be confused with landfilling. Full design information on land treatment is contained in PACE Reports 81-5A and 81-5B. The following is a synopsis of that information.

Design and Selection of Sites

The site should be fairly level and the groundwater level should be at least one or two metres (3-6 feet) below grade. A loam type soil is ideal but not always available. Clay soils tend to retain water, exclude oxygen and are difficult to till. Sometimes tiles are required to drain the site. Very sandy or silty soils may have a low cationic exchange rate or ability to absorb heavy metals. A low point in the landfarm may be required

to accumulate surface run-off but this will depend on rainfall rates. Normally, the collected surface run-off will contain only very small amounts of oil or a visible sheen. A berm may be needed around the site and a drainage system may be provided to the waste water treatment system.

Operating Parameters

Landfarming is a process and, therefore, best results will be obtained when the process is understood and controlled. The oily sludge is concentrated in the top 15 cm (6 inches) or so of soil.[1] Biodegradation requires oxygen, moisture and nutrients such as nitrogen and phosphorous in much the same way as a bio-treater does (C:N:P at 100:10:1). The API Manual on Disposal of Refinery Wastes[2], provides a nomogram for determining the amount of nutrients or fertilizer needed for degradation of a given amount of oil.

Soil temperature cannot be controlled. As the microbes are most active in the 10-47°C range (50-116°F)[1], landfarm operations should be undertaken during the warm months.

The optimum pH range is 6-8. Lower pH ranges tend to increase metal solubility and therefore increase groundwater contamination[2]. Lime addition to acidic soils can be beneficial.

One of the most important factors is oxygen availability, particularly if the soil contains clay. Oxygen can be supplied to the soil by rotatilling, disking, harrowing, etc. A rotatiller attached to the rear of a farm tractor equipped with a power take-off is frequently used. A shield over the rotatiller can reduce dust from the operations. Rotatilling approximately every two weeks will generally be sufficient until the oil level in the soil decreases to 2% or 3%[2].

There is very little consistent data in the literature concerning the effects of heavy metals on soil micro-organisms. This is because the degree to which these metals are absorbed on clay and soil organics is variable.

Application

Since landfarming is not carried out during the winter months, some type of impermeable lined pit, steel tank or concrete basin should be provided to safely stockpile sludges accumulated during cold or wet weather.

A specially equipped truck with some type of horizontal distributor pipe is generally employed for spreading wastes. Where distances are short, a fire hose connected to a fixed piping system has been used. The main objective is an even application to the soil. Heavier sludges may have to be hauled in a dump truck and spread by a grader or bulldozer. Sludges can be injected a few inches below grade to prevent odours, and to do this special equipment is needed.

The oil in soil level can be in the range of 5 to 10%. Levels above 10% tend to starve the bacteria for oxygen. It is best to apply the sludge at least three or four times during the summer rather than all at once. If this is done under ideal conditions, up to 230m^3/hectare (580 bbls/acre) may be degraded in one season[1] depending upon temperature, oil composition, type of soil, etc. The most readily oxidized hydrocarbons are n-paraffins (C_9 - C_{18}) followed by branched alkanes, n-paraffins (C_5 - C_8) while ringed compounds are the most difficult to degrade.

Marketing wastes amenable to land treatment include the following:

- o Bunker Tank Bottoms - reduced application rates are required since the oils degrade slowly because of their chemical composition.

- o Gasoline Tank Bottoms - the sludges may contain very high concentrations of cresol derivatives found in gasoline gum inhibitors.

- o Oily interceptor sludges.

- o Storm Pond Silt - should be no problem.

- o Biological sludges - odours should not be a problem with properly stabilized sludge (20-30 days aeration). No nutrients should be needed as only the "bones" containing nutrients are present in the sludge. A loading of 50 tonnes per hectare per year (20 tons/acre) can be tolerated. Soil aeration is not critical, however, non-stabilized sludge does require aeration.

- o Oil spill wastes may be degraded provided an analysis for heavy metals is done first.

Monitoring

Before a landfarm site is established it is essential to apply for a permit and to supply pre-operational data. For example:

- Plot plan showing slopes, catchment area and berms if required.

- Road access, security arrangements, etc.

- Bore holes results, e.g. water table level and analysis of water for oils, phenols, heavy metals, etc.

- Proposed application rates for specific wastes.

All of the provinces require operational monitoring which is site specific. This usually involves establishment of a suitable number of groundwater monitoring wells depending on the size and location of the site. In addition, monthly or quarterly analysis for hydrocarbons, phenols and heavy metals as well as any other chemicals of concern is usually required.

Soil analysis should be carried out periodically to monitor the oil content of the soil and to ensure that heavy metals have not built up to the point where they become toxic to soil bacteria.

6.3 Collection and Disposal of Used Motor Oils

General

The organized collection and disposal of various types of used automotive oils is a well established practice in marketing facilities across Canada.

To put the used motor oil issue into perspective, it is a general rule of thumb that the volume of such oils in Canada is approximately 4.5 litres (1 gallon) per capita per year. This translates into a total volume of 118 million litres (26 million gallons) per year of used motor oil alone. If transmission, rear axle lubricants and other miscellaneous oils are added in, this volume is increased.

PACE, in a survey conducted in June of 1982 (Report 82-1, "Canadian Petroleum Industry Marketing Waste Survey"), found that the majority of service stations have some type of tank, usually underground, for the collection of used oils. These used oils are generally collected and taken to a waste oil reclamation plant for reconstitution into usable motor oils. There are a number of such plants across Canada and these are listed in Appendix 4.

In some provinces these oils can be used for dust suppression on roads as long as certain restrictions on their use are observed. In the Province of Ontario, e.g. used oils with greater than 50 ppm of PCB's are considered hazardous and cannot be used for this purpose. The practice of employing used motor oils for road dusting is falling out of favour with regulatory agencies.

Requirements for a Used Oil Collection Facility

In December 1985 the Ontario Ministry of the Environment issued draft "Guidelines for the Handling and Disposal of Selected Liquid Wastes from Retail Automotive Service Stations". These guidelines may be summarized as follows:

1. The used oil tank must be employed only for petroleum based hydrocarbons.

2. The tank should be capped against rainfall and be water tight.

3. A government approved pick-up service should be engaged preferably one that will take the oil to a waste oil reclamation plant.

4. The operator should enquire as to how the used oil will be disposed of or reclaimed. For example, oil used as a fuel for space heating may emit hazardous air pollutants such as lead fumes.

5. Under no circumstances should used oils be allowed to enter the municipal sewer system.

6. Spills or leaks must be reported immediately.

It is sometimes difficult for an individual to locate service stations accepting used oils. There is a public perception that used oil cannot be returned unless it was purchased at that particular service station. A prominent sign indicating to the public that they may bring their used motor oils to the service station regardless of purchase origin, would be a decided environmental asset.

Comments on Used Oil Transportation

Normally in Ontario no manifest is required if the used oil is to be returned to a refinery for recycling into the process. If however, the used oil is to be disposed of through the refinery's waste water treatment system, a manifest showing the refinery's Certificate of Approval covering the treatment of such a waste must be shown.

If the used oil is to be returned from a service station to a bulk plant or terminal then the latter must have a Certificate of Approval from the Ministry of the Environment for such storage and this must be shown on the manifest. It is common for companies to pre-register specified bulk plants and terminals equippped to receive used oil.

In certain provinces such as Ontario, it is necessary to obtain a Certificate of Approval from the Ministry of the Environment prior to using a company vehicle for moving used oil. A company can obtain a province-wide certificate to cover all of its waste hauling vehicles.

In Quebec used oil is considered to be non hazardous and comes under the heading of a special waste in Division VI of the Hazardous Waste Regulations under the Environmental Quality Act. The regulation does not require a shipping manifest from a generator to a waste transfer centre or from a generator to a waste recycling site located in the province of Quebec. The carrier however is required to keep a register as prescribed by the regulations.

Alberta's Oil Drop Program has been in operation two years. About 350 conveniently located drop off points are available for the acceptance of used oil. Municipalities were given assistance in setting up the program. Large regional landfill sites have been equipped with storage tanks in the 14,000 to 23,000 litre range (3,000 - 5,000 gallons). The oil is re-refined at either of two plants in the province.

In British Columbia used oil is considered a special waste. A draft regulation respecting handling and transportation of used oil is under review. The current draft restricts the use of used oil as a dust suppressant and imposes restrictions on incineration unless special equipment is installed. A manifest is required for all used oils in excess of 500 kg (1100 lbs). Currently used oil is being picked up by private carriers and taken to one of two re-refiners, Mohawk in Vancouver and Hypower in Victoria.

6.4 Oil/Water Interceptors

General

Most Marketing facilities, including service stations, are equipped with some type of gravity separator, or interceptor, for the purpose of removing suspended solids and oil from contaminated water before discharging it to the local sewer system.

Interceptors may be used for the following:

(a) Washings from service bays in a service station.

(b) Storm water or surface run-off from roofs and paved areas before discharging the water to the local sewer system.

(c) Packaging and Blending Plants for floor washings and other sources of water containing small amounts of oil and suspended solids.

(d) Waste waters from car washes.

While the design and use of septic tanks is well regulated by local health authorities, it is only recently that environmental regulatory agencies are showing interest in oily water interceptors.

Due to the use of detergents and other chemicals for floor washing, the oil phase becomes emulsified and is therefore not entirely removable by simple gravity separation.

The effectiveness of interceptor type as against oil removal has been reported in a 1982 PACE Study (Report 82-2, "Study on Service Station Effluents").

Maintenance of Interceptors

Certain Provincial jurisdictions have established maintenance guidelines such as the following for service station interceptors:

1. The minimum interval for routine inspections should be once every three months.

2. Servicing and clean out is required when the oil reaches a depth of 4 inches or the solids 12 inches.

3. Clean out of interceptors should be carried out at least once a year.

4. Clean out should be done by an MOE (Ministry of Environment) approved carrier equipped with a vacuum unit.

5. The oil layer is to be removed by suction.

6. The intermediate water layer is to be left as a seal.

7. The interceptor(s) should be inspected by the operator to ensure that no oil or sludge residues are left.

8. The operator is responsible for ensuring that all waste removed from the interceptor(s) has been taken to an approved waste management facility.

9. All drainage must be directed to the first compartment.

10. No changes can be made to the piping or baffles in the interceptor unless approval is obtained from the manufacturer or a qualified design engineer.

11. No volatile products such as gasoline or solvents should be sent to the interceptor intentionally.

12. Records must be kept on the particulars and dates of inspections, clean outs and spills.

Interceptor Efficiency and Design Considerations

Most facilities designed to separate oil from water and solids are equipped with either one, two or even three interceptor basins. In the Province of Quebec, the Plumbing Code specifies a large single compartment with internal baffles.

Since the ability to separate oil and solids from water is dependent upon a number of variables such as hold up time, amount of oil intake and the number of times the service bays were washed with detergent, definite conclusions cannot be drawn from the PACE 1982 study, regarding the advantages of one interceptor configuration over another.

The removal efficiency for each interceptor type was reported as follows:

	Removal Efficiency	
	Oil and Grease	Suspended Solids
Two-stage interceptors	72	89
Three-stage interceptor	98	90
Quebec design I	89	82
Quebec design II	90	92

Solids removal efficiencies were all above 80%.

Emulsified oils accounted for 8 - 30% of the total oil discharged. Hold up time under peak flow conditions varied between 60 minutes and 130 minutes.

Legislated Interceptor Effluent Limits

Most municipalities across Canada have enacted bylaws governing the control of waste waters into their sewer systems. The Marketing facility operator should familiarize himself with local bylaws controlling municipal sewer discharges.

6.5 Landfill

General

For petroleum plant wastes, landfill remains the most common method of ultimate disposal. At the same time, no form of disposal has evoked such a wide public concern. This public concern generally stems from the potential threat posed by these landfill sites to the quality of groundwater at, adjacent to, or even a considerable distance from them.

Much of this concern is based on experience with badly designed or mismanged landfill operations. Today, care should be taken to distinguish between a secure landfill, a sanitary landfill and a small town dump site when deciding on an appropriate site for industrial plant wastes.

A secure landfill means burial of a waste, generally in containers, at a geologically chosen site, where groundwater is protected by clay or plastic barriers, and has a leachate collection and a groundwater monitoring system.

A sanitary or municipal landfill is generally used for the burial of non-hazardous waste, such as domestic refuse, without the benefit of liners and usually without a leachate collection system.

A secure landfill is essentially a well engineered, well operated and environmentally safe disposal system. Unfortunately, not all landfills meet secure landfill criteria and therein lies the reason for public concern.

Site Selection

No site should be used for landfilling unless the geological and hydrogeological conditions have been investigated and found to be environmentally satisfactory. This investigation will include establishing the elevation of the water table, direction of underground water movement with gradients, quality of existing groundwater at and around the site, as well as soil strata, location of bed rock, surface drainage, etc. In no case should a landfill site be even considered if it intrudes into a fresh water aquifer which is being, or may be, used for a potable water supply. In selecting a site for a central industrial waste disposal plant in Ontario, the Ontario Waste Management Corporation[1] established a minimum depth of 10 metres of impervious clay as a liner criteria. This is probably an extreme case because the site will be used to contain only the most hazardous types of industrial waste unacceptable elsewhere. Even with this depth of clay, a back up leachate collection system, with monitoring wells, will be designed into the system.

Design and Operation Considerations

Most landfill sites are below ground requiring cover material, an impervious seal against surface water migration into the waste, followed by levelling and revegetation of the area when the site

is full. Monitoring wells around the perimeter are needed to ensure that contaminated leachate does not migrate into the surrounding groundwater supplies. A well run operation will provide for daily covering of the compacted waste with up to 1 metre of soil. This prevents odours in the area and the presence of gulls whose droppings can cause disease in foraging cattle and thereby transmission to humans.

While an area offering natural containment is preferred, this is not always possible in real life. Clay permeabilities of up to 10^{-8} cm/sec are desirable according to P.K. Saint et al[2]. The landfill site may be equipped with an impervious liner such as concrete, asphalt, rubber, plastic or a combination of these. Compatability of the waste with the liner material over a long period of time is essential.[6] Extra insurance can be obtained by lining the fill area with limestone to increase the pH of the leachate thereby inhibiting the migration of soluble metal compounds.

Landfill sites may be partially below and above ground, or all above ground. Sometimes such sites become recreational areas for parks, ski slopes, etc. The same basic requirements apply to these sites. They must be engineered in such a way that leachate is minimized, monitored and treated if necessary. An impervious cover or cap is required to prevent migration of rainfall into the waste. The earth covering should be deep enough to support vegetation.

Wastes Amenable to Landfilling

Landfilling is such a versatile method of disposal that a safe approach might be to list materials which should not be disposed of this way. These would include materials such as:

- Acid wastes
- Cyanides
- Halogenated organic compounds
- Materials containing PCB's, above 50 ppm

In general, the environmental engineer when considering landfill, either on-site or off-site, should be aware of the volume of containment required and that which an individual landfill site can provide. If there is a risk of contaminating the leachate and surrounding groundwater, some other type of disposal should be considered. In the U.S.A., plants using dump sites have been held financially accountable by the courts for cleaning-up the whole site when the groundwater became contaminated.

We can expect future restrictions on landfilling of certain wastes in Canada as viable alternatives become available. At this point many practices are simply being tolerated by regulatory authorities.

Future of Landfill Operations

Landfill sites will be in operation for some time in the future, but less dependence will be placed upon them. The present situation is one of quiet tolerance by governmental authorities in the face of a situation which will take time to correct. In Ontario there are six sites accepting liquid industrial wastes. This will likely continue until at least 1990 when a central (OWMC) facility may be built in the Lincoln-Welland area. As central facilities come into operation, pressure will be put on the generators to use these much more expensive disposal plants. This has happened already in Quebec where Stablex has located a plant designed for inorganic wastes at Blainville. Users can expect to pay 10 to 30 times the present cost of landfilling ($16.30/ton in 1980)[4]. Even though incineration and chemical fixation will be used by these sophisticated disposal plants in the future, the residues produced by these processes will require landfilling.

References

1. Ontario Waste Management Corporation "Interim Report on Priority of Study of Zones 1 and 2 Lands Golden Horseshoe - Geological Considerations", April 1983 by Gartner Lee Associates Ltd., p.14.

2. Saint, P.K. et al. "Effect of Landfill Disposal of Chemical Wastes on groundwater Quality", presented at Geological Society of America, Minneapolis, Minnesota, 1972.

3. EPA "Liners for Sanitary Landfills and Chemical and Hazardous Waste Sites", by Ware, S.A. and G.S. Jackson, EPA-600/9-78-005. EPA Cincinnati, Ohio, May 1978.

4. PACE Report No. 80-4, "Canadian Petroleum Refinery Industry Waste Survey", October 1980.

5. Chemical Engineering Journal September 1985 "Chemical Engineers Speak Out on Hazardous Waste Management."

6. Civic Public Works "Landfill Liners, Clay or Rubber. How Effective are They?", April 1985.

6.6 Leaded Gasoline Sludge Disposal

General

Over a period of years, leaded gasoline tanks accumulate liquids and solids in the bottom. If the tank is to be entered for repairs or serviced internally, these wastes must be removed by trained personnel.

Background

Finished gasoline is composed of several base stocks and a number of additives, such as tetraethyl lead, manganese compounds, gum inhibitors, detergents, anti-icing compounds, dyes, etc. During the blending process it is possible for liquids in the bottom of the component tanks to be carried over into the finished storage tank. This carryover may consist of water, caustic streams, Merox catalyst and inhibitors containing derivatives of phenol and cresol injected into the rundown stream. The sludge will also contain some scale and rust from the inside of the storage tank.

Potential Hazards

There are two major hazards connected with removing lead sludges from a storage tank. The first is that the air in the tank will contain organic lead requiring air supplied protective respiratory equipment, meeting government requirements, to be worn by all employees entering the tank. The second is the physical contact with organic lead which is prevented by use of special protective clothing including socks, underwear, gloves, boots, impervious to gasoline, etc. must be provided, with spares as well. Strict personal hygiene is required with shower facilities available following the day's work, plus the washing of hands before eating or smoking. The supervisor of the work site must not only be fully aware of the hazards beforehand, he must make certain that his written procedures are enforced to the limit. All plants should have clear-cut written procedures for tank entry and cleaning. The API[3] have an excellent publication on the "Cleaning of Petroleum Storage Tanks" outlining safety recommendations which should be followed.

It should be noted that this section is not intended to be a definitive instruction on how to clean leaded storage tanks. References at the end of this section should be consulted for

further details. The supervisor in charge and the plant environmental coordinator should work closely with the plant physician and provincial regulatory agencies before carrying out such work.

Leaded sludge removed from a tank must not be deposited carelessly within the tank compound. Under acidic soil conditions, the lead can be leached into the groundwater. The disposal area should be adequately fenced and proper signs posted to prevent uncontrolled access.

Removal and Transportation

Since the volume of leaded sludge is generally small, hand tools such as shovels, brooms, scrapers, buckets and rags are generally used for cleaning purposes. Care should be taken to ensure that all electrial equipment is explosion proof and suitable for a hydrocarbon atmosphere.

If the leaded sludge is to be disposed of by an outside contractor, a shipping manifest will be required.

All equipment used during the cleaning should be thoroughly washed and decontaminated before being stored.

Disposal Practices

Where permitted by law, leaded sludge may be disposed of by weathering[2]. The sludge is spread to a depth of 8 cm (3 inches) or less on a relatively impervious surface such as concrete or clay and allowed to weather. If the temperature is above 0°C (32°F) this will take only four weeks, but a longer period is desirable.

References

1. American Petroleum Institute "1982 Refinery Solid Wastes Survey" by Environmental Resources Management Inc., West Chester, Pennsylvania 19380.

2. American Petroleum Institute Publication 2015A "Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning", June 1982.

3. American Petroleum Institute Publication 2105 "Cleaning of Petroleum Storage Tanks".

6.7 Incineration

General

Incineration may be used to destroy organics or even to transform certain types of inorganics under controlled conditions. The by-products of incineration are gases and inert solids. The burning process may or may not require an external fuel supply such as natural gas.

There are a number of different types of incinerators including, rotary kiln, fluidized multiple hearth bed and direct burning. Rotary kilns are the most widely used.

Background

Incinerators were commonly used for the burning of municipal wastes during the 1950's and 1960's. The advent of air pollution regulations forced either closure of most of these plants or extensive modifications. As landfill sites become more distant as a result of siting problems, incineration with energy recovery is becoming an accepted practice for municipalities. The improvements in combustion control and pollution control

equipment are making incinerators more acceptable. Environment Canada is currently conducting a "National Incinerator and Testing and Evaluation Program" (NITEP)[1] at three typical energy from waste installations in Hamilton, Montreal and Parkdale (Prince Edward Island). The purpose of this testing program is to evaluate performance under various operating conditions.

Incineration is the ultimate in volume reduction [2]. Not only is volume reduced, but heavy metals are usually transformed into their oxides which are generally less toxic. Combustible carcinogenic materials and biologically active compounds can be destroyed this way. Disposal of the ash usual presents no serious problem.

Incinerators however can present serious air pollution problems depending upon the composition of the original waste. Sulphur dioxide, sulphur trioxide, uncombusted hydrocarbons, hydrogen chloride, nitrogen oxides, heavy metals and particulates may be emitted from the stack. Often scrubber filters and electrostatic precipitators are required to remove or reduce the concentration of these contaminants to acceptable limits. Waste waters from scrubbers are usually acidic and contain dissolved and suspended solids as well.

Burner Type Incinerators

Steam or air is used to atomize the wastes which are burned in a refractory lined fire box. This can be either an open ended retort, a vertical cylindrical furnace or a rotary kiln. The design is simple, relatively low cost and favours small installations located close to the source. Liquid wastes with a high heat content, which can be rapidly atomized and combusted within the flow pattern, are suited to this type of incinerator. Residence times are rarely more than one second.

Fluid Bed Incinerators

These incinerators consist of a refractory lined cylindrical reactor containing a heated fluidized sand bed. An air blower keeps the sand bed suspended. The waste is injected into the fluidized sand bed where the temperature is between 900 and 1000°C (1600-1800°F). Thermal cracking and burning occur with light ends combustion in the area above the sand bed. Combustion air can be heated by the hot flue gases. A cyclone or wet scrubber is usually required to remove the sand carried over from the bed.

This type of incinerator generally handles all materials which can be injected into the bed by a progressive cavity pump or screw feeder[2]. The incinerator is relatively insensitive to changes in the heating value of the waste. Disadvantages are high capital cost and the amount of preheated air required. At reduced waste injection rates fuel utilization is poor.

Multiple Hearth Incinerators

This type of incinerator consists of a vertical cylindrical shell with a series of horizontal hearths placed one above the other. Waste is fed to the top of the shell and moved by rotating rabble arms to the centre of the hearth where it drops to the next level. In a standard six hearth model sludge is dried on the first and second hearths, burned on the next three and the ash cooled on the sixth. Preheated combustion air is distributed via a central shaft and cools the rabble arms. Advantages are high thermal efficiency and reduced auxiliary fuel needs. Disadvantages are thermal damage and corrosion to moving parts. Wastes which are too soupy to form furrows, particles 2 cm (1 inch) or more in size and wastes which become sticky and form crusts when heated are not suitable feed. There are more than 100 installations in the U.S.A.[2] disposing of municipal sludges.

Rotary Kilns

Rotary kilns consist of a slightly inclined refractory lined rotating cylinder. The waste is fed via a belt or screw conveyor. Liquid wastes may be sprayed into the kiln through an atomizing nozzle. Auxiliary fuel burners in the afterburning section complete the combustion of soot and vapours liberated in the kiln. Rotation of the kiln agitates the waste thereby aiding the combustion process. Temperatures in the kiln are in the order of 800°C to 1400°C[2] (1400°F - 2550°F).

An advantage of this type of incinerator is its ability to burn wastes with widely varying characteristics. Disadvantages include potential mechanical problems inherent in rotating the large kiln cylinder. Some problems have been experienced with wastes that ball up in the kiln or cake on the refractory creating combustion difficulties in the form of odours and smoke.

Wastes Suitable for Incineration

Incinerators in their various forms are capable of destroying a wide variety of waste materials. Frequently these incinerators require add-ons such as scrubbers, precipitators, bag house filters and sometimes reheat devices. No single technology can handle all wastes under all conditions.

Co-incineration can often be advantageous. This involves burning a hazardous waste with another waste having a significant heating value thereby reducing or eliminating auxiliary fuel requirements.

The current survey found the following materials from some petroleum plants are being incinerated off-site in Canada. These included sludges from gravity separators, bunker tanks, crude and gasoline (non-leaded) gasoline tanks, spent clay, asphalt and glycol/water mixtures.

In the U.S.A.[3] only 2-4% of the five listed wastes were incinerated in 1982.

Future of Process

Centralized industrial waste disposal plants will normally have facilities to incinerate wastes which cannot be treated by physical/chemical methods. As provinces develop such facilities, we can expect to see an increased use of off-site incineration to dispose of a number of wastes now going elsewhere. At an average cost in 1987 of $250/tonne (wet basis) we can expect some hesitation in using this technology.

References

1. Environment Canada "National Incinerator Testing and Evaluation Program", Report EPS 3/UP/1, September 1985.

2. American Petroleum Institute "Manual on Disposal of Refinery Wastes" - Volume III.

3. American Petroleum Institute "1982 Refining Solid Waste Survey" by Environmental Resources Management Inc., West Chester, Pennsylvania 19380.

6.8 Disposal of Waste Batteries

Waste batteries should be stored on site, taking steps to ensure the batteries are not leaking. Storage areas should be curbed or otherwise designed to retain any acid that may leak. A polyethylene liner can help prevent the corrosion of mild steel or reaction of the sulphuric acid with concrete.

When a sufficient number of batteries have been accumulated they should be disposed of at a waste battery reclaiming facility, approved by the Provincial Ministry of the Environment.

If acid leaks or spills occur they may be neutralized by a strong solution of baking or washing soda. Extreme care must be taken when working with acids since the addition of water to sulphuric acid generates heat and could possibly cause a violent release of acid due to steam formation. Since sulphuric acid is extremely corrosive, as well as being highly dangerous to the skin and eyes, it is unwise to drain the acid from batteries.

6.9 Chemical Fixation

General

Wastes may be solidified or chemically fixed following neutralization, detoxification or some other physical/chemical process aimed at volume reduction. The remaining sludges, precipitates or solids may be candidates for this process which results in a solid block of treated waste with structural integrity.

A number of processes and terms are used for this approach[1] such as solidification, stabilization, fixation and encapsulation. The latter process may or may not produce a solid core. While all of these processes differ in detail, their goal is the same, namely production of a solid suitable for landfill. In doing this, the risk of contaminating the leachate is virtually eliminated.

Process Description

Wastes are collected and segregated according to their compatability with each other during the physical treatment process. They are then placed or pumped into a treatment tank where various chemicals are added to cause precipitation, neutralization or detoxification. Sometimes another waste can be used, for example spent caustic, to neutralize an acid waste. The aqueous phase is decanted and either stored as make up for future physical/chemical treatment or biologically treated.

The next step involves contacting the sludge with the chemicals which can bring about solidification. The following materials are in commercial use:

- Cement based materials such as Portland Cement.
- Pozzolanic materials (mixtures of fly ash, blast furnace slag and cement kiln dust) mixed with lime.

- Thermoplastic materials such as bitumen, paraffin and polyethylene.

- Organic polymers such as urea-formaldehyde.

- Glassification - use of glass-like materials.

Regardless of which process, the goal is the same, namely production of a solid. If cement based materials are used, the material may be mixed in a cement mixer en route to the landfill site. This process results in roughly a twofold volume increase over the original waste.

The last step involves pouring the cement/waste mixture into moulds within the landfill cell. When the cell is full, the site will be covered with an impermeable cap and the previous appearance restored.

The previous description decribes a centralized toxic waste disposal plant located in Quebec. In some cases no such plant may exist and it may be necessary to carry out the solidification process on-site. There are a number of companies which can offer such a service.

Wastes Amenable to Chemical Fixation

Wastes with greater than 10-20% of organic components are not generally amenable to this type of treatment. The organics interfere with the chemical process of binding the waste materials together[2].

The presence of certain inorganic compounds can be harmful to the setting and curing of wastes treated by the cement process. Soluble salts of manganese, tin, zinc, copper and lead may interfere with the setting time and concrete strength. Samples of the waste material should be analyzed in advance by the waste facility laboratory and the producer will be advised as to their compatability with this process.

The pozzolanic process can handle moderate levels of organic wastes and shows more tolerance for certain heavy metals than cement based processes.

The other processes are not in wide use and will not be discussed further.

Future of Process

The chemical fixation process is ideally suited to the treatment of highly toxic wastes which cannot be treated economically and safely in any other way. It is significant that centralized industrial waste treatment plants now in operation or being planned depend on this process. If it is premised that a waste should be disposed of into the least sensitive media, then chemical fixation would meet this criteria.

As centralized facilities, either privately or government owned, become available in most provinces, we can expect to see many wastes now disposed of in other ways sent to these plants usually combined with incineration.

Experience indicates that properly formulated solidification systems will produce a solidified mass which will change in the landfill essentially on the same time scale as natural rocks and minerals.[3]

References

1. Pojask, R.B., "Toxic and Hazardous waste Disposal - Processes for Stabilization/Solidification", Ann Arbor Publishers, 1979.

2. Ontario Waste Management Corporation, "Generic Process Technologies Studies", by the Proctor Redfern Group, 1982.

3. Ontario Waste Management Corporation, "Facility Design", by Monenco, 1985.

PART III

APPENDICES

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APPENDIX 1

GLOSSARY OF TERMS AND ABBREVIATIONS

GLOSSARY OF TERMS

AIPG: American Institute of Professional Geologists.

ALBERTA WASTE MATERIALS EXCHANGE: A clearing house that fosters the reuse, recycle and recovery of waste materials. Provides a bulletin listing available wastes and generators. Location: Edmonton, Alberta.

API: American Petroleum Institute.

ASTM: American Society for Testing Materials.

ASWMC: Alberta Special Waste Management Corporation.

AWWA: American Water Works Association.

B.S. & W.: Bottoms sediment and water, a specification test carried out on Bunker fuels and crude oil.

BALLAST WATER: Water used by marine tankers to control the buoyancy of a vessel when cargo holds are not loaded with petroleum products. Ballast water is off-loaded to on-shore tanks when taking on finished products at a Marine Terminal.

BLENDING AND PACKAGING PLANTS: Plants that blend up lube oil, greases and other specialty petroleum products for distribution through service stations and consumer outlets.

BULK PLANT: A smaller storage facility than a Terminal, used to supply finished products to consumers, consumer outlets and service stations.

BUNKER: A heavy fuel oil used as a marine or industrial fuel.

CANADIAN WASTE MATERIALS EXCHANGE: A clearing house that promotes the reuse, recycle and recovery of waste materials. Publishes a periodic bulletin containing availability of wastes from specific generators. Location: Sheridan Park, Ontario.

CANUTEC: Canadian Transport Emergency Centre of the Federal Department of Transport.

CARCINOGEN: A substance capable of causing cancer in living tissue.

CARRIER: A person accepting for transportation or transporting hazardous wastes for storage, treatment or disposal.

CATALYST: A substance which affects, provokes or accelerates chemical reactions without undergoing change itself.

CATION EXCHANGE CAPACITY (CEC): The sum of exchangeable cations a soil can absorb expressed in milli-equivalents per 100 grams of soil. It is a measure of a soil's ability to absorb undesirable ions in exchange for innocuous ions.

CO-DISPOSAL: A mixing of two or more wastes, where such a waste combination has environmental advantages (less hazardous) over the disposal of the waste stream by itself.

COMPOSTING: A process utilizing bacteria and fungi to break down organic materials under controlled conditions into stable humus-like product.

CRADLE TO GRAVE: Handling of hazardous waste from the time of creation of the waste to its ultimate disposal.

CRUDE OIL: A material occurring naturally in the earth predominantly composed of mixtures of chemical compounds made up of carbon and hydrogen with possible traces of sulphur, oxygen, nitrogen and inorganic salts.

CSA: Canadian Standards Association.

CTC: Canadian Transport Commission.

CWE: Canadian Waste Exchange.

DEEP WELL INJECTION: A disposal method used under favourable geological conditions to pump pretreated liquid waste into porous geological strata that is isolated from fresh water aquifers.

DOT-3: Canadian Department of Transport approved brake fluid with high boiling point components.

DOWNSTREAM (PETROLEUM INDUSTRY SECTOR): Segment of the oil industry that manufactures, distributes and markets refined oil products.

EPA: United States Environmental Protection Agency.

ESP: Electro-static precipitator for flue gas dust recovery.

EXPLOSION-PROOF: Electric equipment suitable for use in potentially explosive hydrocarbon atmospheres - (Class 1 Group D - CSA code).

FCCU: Fluid Catalytic Cracking Unit.

FIXATION (CHEMICAL) OF WASTE: A process by which a material is bound or "fixed" into a relatively inert material like a concrete so that leachate from this material is non-toxic.

FOUR R'S: An approach to waste management based on the following four ways of minimizing waste prior to disposal; (a) Reduction, (b) Reuse, (c) Recycling, (d) Recovery.

GENERATOR: A person consigning hazardous waste for storage, treatment or disposal.

GEOLOGY: The science of the earth, its forces, rocks, groundwater and hazards.

GROUNDWATER: Water existing in the soil and rocks, below the land surface (surface water refers to lakes, streams, rivers).

HAZARD: A physical situation with a potential for human injury, damage to property, damage to the environment or a combination of these.

HAZARDOUS WASTE: A waste that due to its nature and quantity is potentially hazardous to human health and the environment and which requires special disposal techniques.

HEAVY FUEL OIL: The residue of crude oil refining processes which remains after the lighter products such as gasolines, diesel and home heating oil have been distilled from the crude oil.

HEAVY OIL: Crude oil which is more viscous, or thicker, than normal crudes and therefore does not flow as freely.

HYDROCARBONS: Organic chemical compounds of hydrogen and carbon atoms which form the basis of all petroleum products. May exist as gases, liquids or solids.

INCINERATOR: A fired heater using controlled combustion for burning waste in order to reduce its volume. Examples of waste incinerator types include rotary kiln, fluidized bed and multiple hearth.

INCINERATOR (SCRUBBER): A specialized incinerator equipped with a flue gas device for removal of particulate or treatment of contaminants in the flue gas.

INDUSTRIAL WASTE INCINERATOR: A special incinerator designed to burn particular types of waste, e.g. chlorinated organic materials. These incinerators are made not only for thermal decomposition of the waste but also for treating the exit flue gases to prevent air pollution.

INTERCEPTOR: A gravity separator for removal of floatable oil and sediments. Made up of compartments designed for a specific residence time to allow for gravity separation of the oil/water/solid phases.

LANDFARMING: See Land Treatment.

LANDFILL: Burial of waste in the ground usually by compacting 3 or 4 feet of waste in cells covered by one foot of soil.

LAND TREATMENT: Commonly called landfarming in the industry. Makes use of soil bacteria to break down organic waste into stable materials.

LC_{50} (Median Lethal Concentration): The concentration of a substance in the form of a vapour, dust or mist which when administered by continuous inhalation to test animals over a period of time causes death to 50% of the test population within a set time period (14 days).

LD_{50} (Median lethal dose): The amount of substance expressed in milligrams per kilogram of body weight which when admiristered to the skin (dermal) or orally to test animals over a period of time causes death to 50% of the test population within a set time period (14 days).

LEACHATE: When water percolates through a material it dissolves (leaches) the soluble compounds from the material. The resulting solution is leachate.

LINER: Plastic membrane and/or clay layer in a secure landfill, designed to prevent the entry of groundwater and the exit of liquid leachate.

MANIFEST: A shipping document, required by the Transportation of Dangerous Goods legislation for all hazardous waste shipments, naming the material, quantity, origin, route and destination.

MEROX: UOP licensed process using a catalyst in a caustic media for removal of mercaptan sulphur compounds (mal-odorous).

MSDS: Material Safety Data Sheet.

MUNICIPAL DUMP: See Sanitary Landfill.

N/A: Not applicable.

NIMBY: "Not in My Back Yard". An acronym used to describe public aversion to siting waste treatment plants in their community.

NWWA: National Water Well Association.

OPEN-PIT BURNING: Burning of waste materials in a partially excavated site.

OWMC: Ontario Waste Management Corporation.

PACE: Petroleum Association for Conservation of the Canadian Environment.

PCB's (POLYCHLORINATED BIPHENYLS): Very stable fire-resistant organic fluids used in making plastics and as insulation in heavy-duty electrical equipment. PCB's do not readily biodegrade in the environment but bioaccumulate in animal tissue. No longer manufactured or sold in Canada, but still contained in older electrical equipment in petroleum plants.

PERCOLATE: Movement of water downward through soil and rock.

PNA: Polynuclear aromatic hydrocarbons - chemical compounds made up of condensed benzene rings, some of which are carcinogens.

PPM: Parts per million.

RCRA: U.S. Resource Conservation and Recovery Act.

RECEIVER: A person or company receiving waste for storage, treatment or disposal.

RECLAIMER: An off-site company that recovers materials from a waste for their monetary value, e.g. reclaiming platinum from a spent catalyst.

RECOVERY: Involves regeneration of a waste or recovery of materials contained in that waste for commercial use, e.g. extraction of cresols from spent phenolic caustics.

RECYCLE: An activity or treatment that eliminates or reduces the volume of a waste by generating a feedstock for another process located on-site e.g. slop oil to crude distillation unit.

REDUCTION: Lowering the quantity of waste generated at source by:

1) Making a process or feedstock change.
2) Increasing system efficiency of process.
3) Modifying the product slate with the objective of decreasing the quantity of the waste material generated.

REFINERY: A complex of process units used for the separation and conversion of crude oil (conventional or synthetic) into consumable petroleum products.

REUSE: A secondary use found for a normally discarded waste, e.g. fly ash from flue gases used in cement manufacture.

RISK: A measure of the potential threat from hazardous waste which depends on the nature of the hazard presented and the probability of its occurrence.

ROAD OILING: Use of oils or oil by-products for dust suppression on dirt roads.

SANITARY LANDFILL: A means of municipal waste disposal where waste is placed in the ground, compacted by repeated bulldozing and covered with earth to a specific thickness. It generally does not have a liner or leachate collection system.

SECURE LANDFILL: Burial of waste, generally in containers, at a geologically chosen site, protected by clay or plastic barriers to groundwater, with a leachate collection system and a groundwater monitoring system.

SERVICE STATIONS: Retail outlets for major automotive products such as gasoline, diesel fuel and L.P.G. Also sell lube oils and greases and specialty commodities. Many service stations provide mechanical servicing of automobiles and trucks.

SPACE HEATER: A small heating device that uses electricity, gas or oil to supply heat to a room or storage area.

TDGA: Federal Transportation of Dangerous Goods Act (1980).

TDGR: Transportation of Dangerous Good Regulations.

TERMINAL: A large volume storage facility for finished petroleum products such as diesel, furnace oils, gasoline and aviation fuel. Terminals are used to ship products by tank truck, tank car, pipeline, barge or marine tanker.

"TOWN" DUMP: Sanitary landfill used in small communities where waste may be exposed to open pit burning prior to burial.

TOXIC WASTE: A waste material capable of causing injury, illness or damage to humans, animals or other living organisms through oral ingestion, inhalation or absorption through any body surface.

UPSTREAM (PETROLEUM INDUSTRY SECTOR): That segment of the oil industry that explores for and produces, oil and natural gas.

WASTE: A material for which the owner or generator has no further use and discards.

WATER TABLE: Groundwater percolates downward until it saturates all the pores in the soil and rock. The upper edge of this saturated zone is the water table.

WDS: Waste Data Sheets.

APPENDIX 2

LICENSED (APPROVED) HAZARDOUS WASTE TREATMENT AND DISPOSAL FACILITIES

LICENSED (APPROVED) HAZARDOUS WASTE TREATMENT AND DISPOSAL FACILITIES

(Based on information collated up to June, 1987)

The following is a summary of licensed hazardous waste treatment and disposal facilities available across Canada:

BRITISH COLUMBIA

1.0 Existing Facilities:

None

2.0 Future Facilities Under Discussion or Development:

Genstar/IT Corporation proposal included:
- Physical/chemical treatment for special wastes
- Solidification of residues
- Secure landfill
- Use cement kiln for incineration of organic wastes

Genstar/IT Corporation withdrew the above proposal on July 30, 1984.

B.C. Government currently studying other options.
Proposed site: Undetermined.

ALBERTA

1.0 Existing Facilities:

1.1 Alberta Special Waste Management Corporation (ASWMC) (Crown Corporation)
- Charged with responsibility to oversee the development and coordination of a waste management system.

Operator: Chem-Security Limited

Facilities: Designed to include:
- two high temperature incinerators
- physical/chemical treatment including solidification for inorganics
- secure chemical landfill
- deepwell disposal for treated liquids

Status: Plant receiving certain waste. Physical/chemical treatment and incineration to be operational by fall of 1987.

Location: Swan Hills, Alberta
Phone Number: (403) 333-4197

ONTARIO

1.0 Existing Facilities:

1.1 Operator: Tricil (Sarnia) Limited

Location: RR#1 (Telfer Side Road)
Corunna, Ontario NON 1GO

Phone Number: (519) 864-1021

Facilities/Services:
- Waste transport
- Pre-treatment/fixation of liquid wastes with fly ash.
- High temperature and 2-chamber organic liquid waste incinerator - 99.99% destruction efficiency equipped with acid gas flue gas scrubber and fabric filters.
- Secure chemical landfill

2.0 Future Facilities Under Discussion or Development:

2.1 Ontario Waste Management Corporation (OWMC)
(Crown Corporation)

Facilities to include:
- High temperature rotary kiln incinerator with flue gas scrubbing
- Physical/chemical treatment plant with solidification capability
- Secure landfill

Proposed site: West Lincoln County, Ontario.

QUEBEC

1.0 Existing Facilities:

1.1 Operator: Tricil (Quebec) Inc.

Location: 6785 Route 132
Ville Ste. Catherine, Quebec JOL 1EO

Phone Number: (514) 632-6640

Facilities/Services:
- Waste transport
- Industrial in-plant maintenance and clean-up

1.2 Operator: Entreprises d'Incineration Industriel Goodfellow Inc.

Location: 18a Rang, Ste. Marguerite
Ville Mercier, Quebec J0L 1K0

Phone Number: (514) 691-9610

Facilities/Services:
- High temperature incineration of organic wastes

1.3 Operator: Stablex Canada Incorporated

Location: 760 Boulevard Industriel, C.P. 420
Ste. Therese de Blainville, Que. J7E 4J7

Phone Number: (514) 430-9240

Facilities/Services:
- Chemical fixation of inorganic wastes
- Secure landfill

2.0 Future Facilities Under Discussion or Development:

2.1 SERDOQ (Societe d'Elimination et Recyclage des Dechets Organiques au Quebec) - private consortium

Plans call for $45 million high temperature rotary kiln with spray dryer/electrostatic precipitator and flue gas wet scrubber.

Proposed site: Undetermined.

APPENDIX 3

LIST OF GOVERNMENT ENVIRONMENTAL AGENCIES INVOLVED IN WASTE MANAGEMENT

LIST OF GOVERNMENT ENVIRONMENTAL AGENCIES INVOLVED IN WASTE MANAGEMENT

(Based on information collated up to June, 1987)

FEDERAL

Environmental Protection Service
Environment Canada
Place Vincent Massey Building
351 St. Joseph Boulevard
Hull, Quebec K1A 1C8
(819) 997-3376

PROVINCIAL

British Columbia
Waste Management Branch
Ministry of Environment
Parliament Buildings
Victoria, British Columbia V8V 1X5
(604)387-4321

B.C. Regional Offices:

Vancouver Island
2569 Kenworth Road
Nanaimo V9T 4P7
(604) 758-3951

Kootenay
310 Ward Street
Nelson V1L 5R4
(604) 352-2211

Omineca-Peace
1011 Fourth Avenue
Prince George V2L 3H9
(604) 563-1181

Lower Mainland
10334-152A Street
Surrey V3R 7P8
(604) 584-8822

Cariboo
3015J Glendale Drive
Williams Lake V2G 1P5
(604) 398-6702

Okanagan
3547 Skaha Lake Road
Penticton V2A 7K2
(604) 493-8261

Thompson Nicola
1259 Dalhousie Drive
Kamloops V2C 2T6
(604) 374-9717

Skeena
P.O. Box 5000
Smithers V0J 2N0
(604) 847-4411

Alberta
Pollution Control Division
Alberta Environment
9820 -106 Street
Edmonton, Alberta T5K 2J6
(403) 427-5868

Saskatchewan
Department of the environment
Waste Management Division
3085 Albert Street
Regina, Saskatchewan S4S 0B1
(306) 787-5811

Manitoba
Department of Environment Workplace Safety & Health
Environmental Management Division
Box 7, Building 2 - 139 Tuxedo Avenue
Winnipeg, Manitoba R3N 0H6
(204) 944-9888

Ontario
Waste Management Branch
Ontario Ministry of the Environment
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5
(416) 965-6191

Quebec
Ministry of the Environment
Land Division
3900 rue Marly
Saint-Foy, Quebec G1X 4E4
(418) 643-4336

New Brunswick
Environment New Brunswick
P.O. Box 6000
Fredericton, New Brunswick E3B 5H1
(506) 453-2861

Nova Scotia
Department of Environment
P.O. Box 2107
Halifax, Nova Scotia B3J 3B7
(902) 424-5300

Prince Edward Island
Department of Community Affairs
P.O. Box 2000
Charlottetown, P.E.I. C1A 7N8
(902) 892-0311

Newfoundland
Department of Environment
Elizabeth Towers, Elizabeth Avenue
St. John's, Newfoundland A1B 1R9
(709) 737-2559

Territories:

Yukon
Transport Services Administrator
Department of Community and Transportation Services
P.O. Box 2703
Whitehorse, Yukon Y1A 2C6
(403) 667-5833

Northwest Territories
Pollution Control Division
Department of Renewable Resources
Box 1320
Yellowknife, NWT X1A 2L9
(403) 873-7654

APPENDIX 4

USED OIL RE-REFINERS

USED OIL RE-REFINERS

(Based on information collated up to June 1987)

(1) Canadian Oil Company Limited
309 Cherry Street
Toronto, Ontario
M5A 3L3

Contact: Mr. David Fisher (Business Manager) (416) 462-6100

(2) Breslube Enterprises
P.O. Box 130
Breslau, Ontario
N0B 1M0

Contact: Mr. Joseph Chaloub (President) (519) 648-2291

(3) Mohawk Lubricants Ltd.
170 Harbour Avenue
North Vancouver, B.C.
V7J 2E6

Contact: Mr. Fred Gingell (President) (604) 299-7244
Mr. W. Duncan (Group V.P.)

(4) HUB Oil Company
5805 17th Avenue S.E.
Calgary, Alberta
T2A 0W4

Contact: Mr. Jake Kalmacoff (403) 248-1900

(5) Turbo Resources Limited
P.O. Box 5827, Station "LL"
Edmonton, Alberta
T6C 4G3

Contact: Mr. Doug Cameron (403) 467-7311

(6) Hy-Power Bio-Gas and Oil Company
2015 Mill Stream Road
Victoria, B.C.
V8X 3X2

Contact: Mr. Fred Carver (President) (604) 474-3991

DATE: APRIL 1987

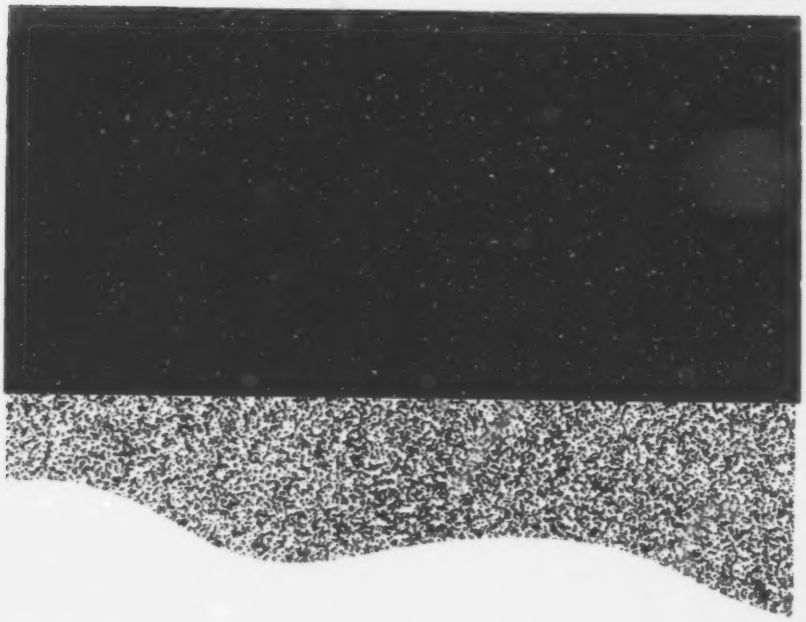
APPENDIX 5

HAZARDOUS WASTE CLASSIFICATION COMPARISON TABLE

HAZARDOUS WASTE CLASSIFICATION COMPARISON TABLE INSERT

Additional copies are available from:
Environment Canada
Waste Management Division
Conservation & Protection
351 St. Joseph Blvd.
Hull, Quebec K1A 1C8

Users' Guide To HAZARDOUS WASTE CLASSIFICATION (Transportation of Dangerous Goods Regulations)



1st Edition
April, 1986

Canada

PLEASE GIVE US YOUR REACTION

Dear User:

This is the first edition of the "Users' Guide to Hazardous Waste Classification." This guide will be updated as amendments to the TDG Regulations occur.

It is designed to provide guidance to the procedures that must be followed for all hazardous waste shipments.

We would be very interested to receive your comments on this guide's effectiveness and usefulness to you.

You may forward your comments to:

Waste Management Division
Industrial Programs Branch
Conservation and Protection
Environment Canada
Place Vincent Massey, 13th Floor
351 St. Joseph Blvd.
Hull, Quebec, K1A 1C8

Background

The Transportation of Dangerous Goods Act (TDGA) was passed in 1980. The Act promotes public safety before, during and after the transporting of dangerous goods and hazardous wastes. The Act is administered by Transport Canada. Environment Canada provides technical advice and recommends regulatory initiatives on matters related to hazardous wastes.

What is the purpose of this guide?

This guide is designed to provide guidance on the hazardous waste aspects of the Transportation of Dangerous Goods Regulations, which came into effect on July 1, 1985. This guide explains the procedures for determining if a waste is hazardous and for classifying a hazardous waste.

The procedures and classification criteria for identifying dangerous goods and hazardous wastes are described in Part III of the Regulations to this Act. All shipments of dangerous goods and hazardous wastes must be classified according to Part III before they are transported.

Who is this guide for?

The responsibility for identifying a hazardous waste rests primarily with the consignor (generator). Other persons who handle the waste also have an obligation to know if a waste they are managing is hazardous. Therefore, this guide is for the use of persons who generate, handle, transport, treat, store, or dispose of hazardous wastes.

What is a hazardous waste?

Cooperative efforts by federal and provincial environment departments, and industry representatives have led to the development of the following definitions for "waste" and "hazardous waste".

Waste is any substance for which a consignor/generator has no further use and which he discards.

Hazardous Wastes are those wastes which are potentially hazardous to human health and/or the environment due to their nature and quantity, and which require special disposal techniques.

These definitions are not part of the Transportation of Dangerous Goods (TDG) Regulations, although they are widely used as working definitions. The principles of the working definitions are incorporated into the "waste" definition listed in Part I of the TDG Regulations.

The TDG Regulations define a waste as "a product or substance intended for disposal".

The TDG Regulations regulate the following hazardous wastes:

- all discarded specified dangerous goods which are listed in Schedule II, List II of the TDG Regulations;
- all not fully specified waste mixtures/solutions listed in Schedule II, List II, which have hazardous properties described by the criteria in Part III of the TDG Regulations;
- all industrial waste streams listed in Schedule II, List II.

Schedule II, List II, of the TDG Regulations is a comprehensive list of specific and generic groups of dangerous goods and hazardous wastes.

What is classification of hazardous wastes?

Classification is a system which divides hazardous wastes into *classes* and *divisions* based on hazard criteria that are described in Part III of the TDG Regulations.

There are nine different hazard classes. Each type of hazardous waste will have one of these nine classes as its primary classification. In addition, any given hazardous waste may have one or more subsidiary classifications.

A *primary classification* describes the *main hazardous properties* of a particular hazardous waste.

A *subsidiary classification* describes *other hazardous properties* of a particular hazardous waste. These properties are considered to be of secondary concern in transportation when compared with the main hazardous properties of the waste.

In Schedule II, List II, of the TDG Regulations, the classification column (Column III) has the primary classification listed at the top and subsidiary classification(s) listed immediately below for each hazardous waste.

What are the classes and divisions?

The following list briefly describes the nine classes, their divisions, and the type of hazard involved. The classes are numbered from 1 to 9. Divisions also use numbers and are indicated by a point after the class number. For example, with 1.2, 1 is the class and 2 is the division. More detailed descriptions of the criteria for each class and division can be found in the TDG Regulations, Part III.

Class 1 – Explosives[1]

1.1 A substance or article with a mass explosion hazard.

1.2 A substance or article with a fragment projection hazard, but *not* a mass explosion hazard.

1.3 A substance or article which has a fire hazard along with either a minor blast hazard or a minor projection hazard or both, but *not* a mass explosion hazard.

1.4 A substance or article which presents *no* significant hazard. Explosion effects are largely confined to the package. *No* fragment projections of an appreciable size or range are to be expected.

1.5 A very insensitive substance, although it has a mass explosion hazard as in 1.1.

Class 2 – Gases

2.1 A flammable gas.

2.2 A non-flammable, non-toxic, non-corrosive gas.

2.3 A poisonous gas.

2.4 A corrosive gas.

[1] Explosives are classified by Energy, Mines and Resources Canada. Explosives *cannot* be a waste by definition of the Explosives Act.

Class 3 – Flammable Liquids

3.1 A liquid with a closed-cup flash point of less than – 18°C. Extremely flammable.

3.2 A liquid with a closed-cup flash point *not* less than – 18°C, but less than 23°C. Very flammable.

3.3 A liquid with a closed-cup flash point *not* less than 23°C but less than 37.8°C. For international air transport, the flash point is *not* less than 23°C, but less than 60.5°C. For international marine transport and waste, the flash point is *not* less than 23°C, but less than 61°C. Moderately flammable.

Class 4 – Flammable Solids, Substances liable to spontaneous combustion, and Substances that on contact with water emit flammable gases

4.1 A solid which under normal circumstances is readily ignitable and burns persistently; or, which causes or contributes to fire, through friction or from heat retained from manufacturing or processing.

4.2 A substance liable to spontaneous combustion under normal conditions of transport; or, when in contact with air, liable to spontaneous heating to the point where it ignites.

4.3 A substance which, on contact with water, emits dangerous quantities of flammable gases or becomes spontaneously combustible on contact with water or water vapour.

Class 5 – Oxidizing Substances and Organic Peroxides

5.1 A substance which causes or contributes to the combustion of other material by yielding oxygen or oxidizing substances, whether or not the substance itself is combustible.

5.2 An organic compound that contains the bivalent "-0-0-" structure which is a strong oxidizing agent and may be liable to explosive decomposition or is sensitive to heat, shock or friction.

Class 6 – Poisonous Substances and Infectious Substances

6.1 A solid or liquid that is poisonous through inhalation of its vapours, by skin contact or by ingestion.

6.2 Organisms that are reasonably believed to be infectious to humans or animals and the toxins of such organisms.

Class 7 – Radioactive Materials[2]

Radioactive materials with activity greater than 74 kBq/kg, within the meaning of the Atomic Energy Control Act.

Class 8 – Corrosive Substances

A substance that causes visible necrosis of the skin or that corrodes steel or non-clad aluminum.

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[2] Radioactives are classified by the Atomic Energy Control Board. Radioactives *cannot* be a waste by definition of the Atomic Energy Control Act.

Class 9 – Miscellaneous Dangerous Goods[3]

9.1 A substance or product which presents sufficient dangers to warrant regulation, but which cannot be assigned to any other class.

9.2 An environmentally hazardous substance.

9.3 A dangerous waste which presents sufficient dangers to warrant regulation, but which cannot be assigned to any other class.

Class 9.2 and 9.3 are classified by Environment Canada and Provincial Environment Ministries. They use a list of criteria in addition to those for classes 1 to 8. The criteria enables them to determine all of the characteristics of a substance or waste which may be hazardous to human health or the environment. The additional criteria include:

- chronic toxicity
- aquatic toxicity
- bioaccumulation
- persistence in the environment

Substances or wastes that satisfy only these additional criteria listed above are assigned to Class 9.2 and Class 9.3.

These substances or products are added to the appropriate classes in Schedule II, List II, as:

- industrial waste streams, (Waste Type #);
- environmentally hazardous substances, (Class 9.2);
- dangerous wastes, (Class 9.3).

[3] Miscellaneous Dangerous Goods are classified and listed by Transport Canada and Environment Agencies *only*. Goods and wastes with hazards *not* already described by another class are assigned to Class 9.

How to Classify Specified Hazardous Wastes in Classes 2 to 6.1 and 8

A Consignor/Generator Responsibility

This section describes how to classify:

- specified hazardous wastes; and,
- industrial waste streams.

Specified hazardous wastes are listed alphabetically in lower-case letters by their specific chemical name in Schedule II, List II of the TDG Regulations. The consignor must insert the word "Waste" immediately preceding the shipping name to indicate that it is a hazardous waste.

Industrial waste streams are wastes which come from a specific industrial process. Waste stream descriptions are listed in Schedule II, List II of the TDG Regulations. They use Waste Type 1 to 98 as their shipping names.

Step	Description
1.	Read Part I of the TDG Regulations to identify all relevant definitions.
2.	Read Part II of the TDG Regulations to determine if your product or substance is exempted from any part of the Regulations.
3.	Read the legend to Schedule II to determine how to use the Schedule and what the abbreviations mean. Read the first page of List I and List II for a description of the column headings.
4.	Consult Schedule II, List II, Column I, of the TDG Regulations to determine the specified shipping name which exactly describes your product or substance. Remember to place the word "Waste" in front of it.

a) For Domestic or Transborder Consignments

i) Identify the shipping name in Column I.

ii) Identify the product identification number (PIN) in Column II. Note instruction #2 in the legend to Schedule II.

iii) Identify the classification in Column III.

iv) Identify the packing group in Column VII.

v) Read the special provisions in Column IV for specific transportation requirements.

vi) Read the quantity restrictions or prohibitions in Column VIII for passenger aircrafts and vehicles. Column IX states the quantity restrictions for cargo aircrafts.

b) For International Consignments

i) Read the special provisions in Column IV for specific transportation requirements or prohibitions.

ii) Identify the shipping name in Column I. When special provision #40 or #55 is indicated in Column IV, an alternate shipping name is required.

iii) Identify the product identification number in Column II. When special provision #40 or #55 is indicated in Column IV an alternate PIN is required.

iv) Identify the classification in Column V (marine) or Column VI (air).

v) Identify the packing group in Column VII.

vi) Read the quantity restrictions or prohibitions in Column VIII for passenger aircrafts and vehicles. Column IX states the quantity restrictions for cargo aircrafts.

How to Classify Not Fully Specified Hazardous Wastes

A Consignor/Generator Responsibility

This section describes how to classify Not Fully Specified waste substances or products. Not Fully Specified waste shipping names are used to describe general classes of waste mixtures or solutions. They are *not* listed by specific chemical names. They are listed in uppercase letters in Schedule II, List II of the TDG Regulations. In some cases, the letters "N.O.S."[4] follow the shipping name and is part of the legal shipping name.

Step	Description
1.	Read Part I of the TDG Regulations to identify all relevant definitions.
2.	Read Part II of the TDG Regulations to determine if the product or substance is exempted from any part of the Regulations.
3.	Do "flash point test" or other tests, data collection and calculations as appropriate. This is done to determine the hazardous properties of the product or substance.
4.	Check all criteria for Classes 3, 6.1 and 8 and the definitions of Classes 2, 4, and 5 found in Part III of the TDG Regulations. Determine the primary classification, subsidiary classification (if applicable), and packing group for the product or substance according to the applicable definitions, criteria, tests or calculations from Part III.
5.	If you identify more than one classification during the analysis of the waste, then refer to the Order of Precedence Table (Schedule I of the Regulations) to determine which classification is primary and which is subsidiary.

[4] "N.O.S." means "Not Otherwise Specified" in international legislation.

6. If you identify more than one packing group during the analysis of the waste, select the packing group with the lowest roman numeral.

7. Read the legend to Schedule II to determine how to use the Schedule and what the abbreviations mean. Read the first page of List I and List II for a description of the column headings.

8. Choose the Not Fully Specified shipping name from Schedule II, List II, that best describes the primary and subsidiary classifications. Remember to place the word "Waste" in front of it.

9. If the shipping name has the letters "N.O.S." with an asterisk (*) beside it, place the chemical names of the substances in the mixture, in parentheses, following the "N.O.S." shipping name. Only identify the substances that cause the mixture to have the primary and subsidiary classes of the "N.O.S." shipping name.

10. Read the special provisions in Column IV and the quantity restrictions and prohibitions for passenger aircraft and vehicle transport and cargo aircraft in Columns VIII and IX.

How to Classify a Mixture Containing a Specified Hazardous Waste and a Non-Hazardous Waste

Place the word "mixture" or "solution", whichever is applicable, in parentheses, following the shipping name. Then, follow the steps described in the section on how to classify a specific hazardous waste.

How to Classify a Mixture of Two or More Hazardous Wastes

Follow steps 1 to 10, described in the section on how to classify a Not Fully Specified hazardous waste.

How to Classify Hazardous Wastes That Are Diluted Such That Their Properties Do Not Meet the Classification Criteria

The following three situations may occur for a hazardous waste that is *dilute* and does not meet the classification criteria.

1. The TDG Regulations will *not* apply when a waste:
   - has *no* subsidiary classification; and,
   - does *not* meet the criteria of the primary classification described in Part III.
2. The subsidiary classification may still apply for a hazardous waste that:
   - has a specified shipping name; and,
   - has a subsidiary classification, other than 9.2; and,
   - does *not* meet the criteria of the primary classification described in Part III.
3. The subsidiary classification will still apply for a hazardous waste that:
   - is in a domestic or transborder consignment; and,
   - has a specified shipping name; and,
   - has a subsidiary classification of 9.2; and,
   - does *not* meet the criteria of the primary classification described in Part III.

For this case, add the words "**Waste contaminated with**" immediately preceding the shipping name, and remove the product identification number.

Other brochures in the hazardous waste series:

- Users' Guide for the Hazardous Waste Manifest

Appropriate Authorities

For information on the *TDG Regulations*, contact:

Transport Dangerous Goods
Transport Canada
Tower B, Place de Ville
Ottawa, Ontario
K1A 0N5

The following is a list of appropriate authorities in Canada who can provide information on the *hazardous waste classification system*.

Provincial/Territorial Shipments

Alberta

Industrial Wastes Branch
Standards and Approvals Division
Alberta Environment
Oxbridge Place
9820-106 Street
Edmonton, Alberta
T5K 2J6 (403) 427-5868

British Columbia

Waste Management Branch
Ministry of the Environment
Parliament Buildings
Victoria, British Columbia
V8V 1X5 (604) 387-9950

Manitoba

Department of Environment, Workplace, Safety & Health
Environmental Management Division
Box 7, Building 2
139 Tuxedo Ave.
Winnipeg, Manitoba
R3N 0H6 (204) 945-7100

New Brunswick

Municipal Affairs & Environment
Pollution Control Branch
P.O. Box 6000
Fredericton, New Brunswick
E3B 5H1 (506) 453-2861

Newfoundland

Department of Environment
Elizabeth Towers
Elizabeth Ave.
St. John's, Newfoundland
A1C 5T7 (709) 576-2559

Northwest Territories

Pollution Control Division
Department of Renewable Resources
Box 1320
Yellowknife, NWT
X1A 2L9 (403) 873-7654

Nova Scotia

Department of Environment
P.O. Box 2107
Halifax, Nova Scotia
B3J 3B7 (902) 424-5300

Ontario

Waste Management Branch
Ontario Ministry of the Environment
135 St. Clair Ave. W.
Toronto, Ontario
M4V 1P5 (416) 965-9668

Prince Edward Island

Department of Community and
Cultural Affairs
P.O. Box 2000
Charlottetown, P.E.I.
C1A 7N8 (902) 892-0311

Québec

Direction de la Coordination
et du Contrôle
Ministère de l'Environnement
3900 Marly St., B.P. 15
Ste-Foy, Québec
G1X 4E4 (418) 643-7456

Saskatchewan

Lands Protection Branch
Saskatchewan Environment
3085 Albert St.
Regina, Saskatchewan
S4S 0B1 (306) 787-5811

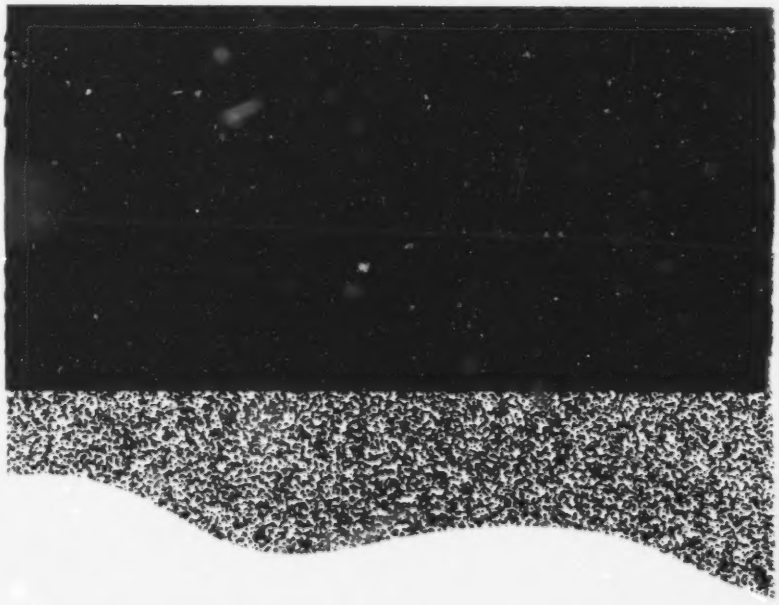
Yukon

Department of Community and
Transportation Services
Government of the Yukon
P.C Box 2703
Whitehorse, Yukon
Y1A 2C6 (403) 667-3032

Transboundary Shipments

Waste Management Division
Industrial Programs Branch
Conservation and Protection
Environment Canada
Place Vincent Massey Bldg.
351 St. Joseph Blvd., 13th Floor
Hull, Québec
K1A 1C8 (819) 997-3376

Guide d'utilisation de LA CLASSIFICATION DES DÉCHETS DANGEREUX (Règlement sur le transport des marchandises dangereuses)



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Canada

VEUILLEZ NOUS FAIRE PART DE VOS RÉACTIONS

Cher utilisateur,

Ceci est la première édition du « guide d'utilisation de la classification des déchets dangereux ». Ce guide sera mis à jour à mesure que se présentent les amendements aux règlements sur le TMD (transport des marchandises dangereuses).

Il est destiné à fournir des indications sur les procédures à respecter pour toutes les expéditions de déchets dangereux.

Nous serions vivement intéressés à recevoir vos commentaires sur l'efficacité et l'utilité de ce guide.

Vous pouvez nous faire parvenir vos commentaires à :

Division de la gestion des déchets
Direction des programmes industriels
Conservation et Protection
Environnement Canada
Place Vincent Massey, 13e étage
351, boul. St-Joseph
Hull (Québec)
K1A 1C8

Contexte

La *Loi sur le transport des marchandises dangereuses* a été approuvée en 1980. Elle a pour but d'assurer la sécurité publique avant, pendant et après le transport de marchandises et de déchets dangereux. L'application de la Loi est confiée à Transports Canada. Environnement Canada offre une assistance technique et recommande des initiatives sur la réglementation des questions relatives aux déchets dangereux.

Quel est le but de ce guide?

Ce guide a pour but de fournir des informations relatives aux aspects du Règlement sur le transport des marchandises dangereuses, en matière de déchets dangereux. Il explique les procédures à suivre, afin de déterminer si un déchet est dangereux et de classer un déchet dangereux.

La partie III du Règlement d'application de cette loi décrit les procédures et les critères de classification qui doivent être utilisés pour identifier les marchandises et les déchets dangereux. Tout envoi de marchandises ou de déchets dangereux doit être classé, en fonction des catégories établies par la partie III, avant d'être transporté.

À qui ce guide s'adresse-t-il?

C'est essentiellement à l'expéditeur (le générateur) qu'incombe la responsabilité d'identifier un déchet dangereux. Les personnes, autres que l'expéditeur, qui manutentionnent le déchet ont aussi l'obligation de savoir si le déchet en question est dangereux. Ce guide est donc destiné aux personnes qui génèrent, manutentionnent, transportent, traitent, entreposent les déchets dangereux ou s'en débarrassent.

Qu'est-ce-qu'un déchet dangereux?

Les efforts de coopération entre, d'une part, les ministères fédéral et provinciaux de l'environnement et les représentants de l'industrie, d'autre part, ont permis de mettre au point les définitions suivantes de « déchet » et de « déchet dangereux ».

Un déchet est une matière, quelle qu'elle soit, dont un expéditeur/ générateur n'a plus l'usage et dont il se débarrasse.

Les déchets dangereux sont des déchets qui peuvent être nocifs à la santé de l'homme et/ou à l'environnement, en raison de leur nature et de leur quantité, et qui exigent des techniques de destruction particulières.

Ces définitions ne font pas partie du Règlement sur le transport des marchandises dangereuses (TMD), bien qu'elles soient largement utilisées comme définitions de travail. Les principes des définitions de travail sont intégrés à la définition du terme « déchet » que l'on peut trouver dans la partie I du Règlement (TMD).

Le Règlement (TMD) donne d'un déchet la définition suivante : « matière ou produit inutilisable ».

Le Règlement (TMD) s'applique aux déchets dangereux suivants :

- toutes les marchandises dangereuses mises au rebut;
- tous les déchets mélangés ou en solution qui ont les propriétés décrites par les critères contenus dans la partie III du Règlement sur le transport des marchandises dangereuses (TMD);
- tous les effluents industriels énumérés.

La liste II, annexe II, du Règlement sur le transport des marchandises dangereuses est une liste exhaustive des groupes spécifiques et généraux de marchandises et de déchets dangereux.

En quoi consiste une classification des déchets dangereux?

La *classification* est un système qui assigne les déchets dangereux à une *classe* et à une *division*, établies d'après des critères de danger énumérés dans la partie III du Règlement sur le transport des marchandises dangereuses.

Il existe neuf classes différentes de dangers. Chaque type de déchet est inscrit dans l'une de ces neuf classes (classe prioritaire). De plus, tout déchet dangereux peut faire l'objet d'une ou plusieurs classifications subsidiaires.

Une *classification primaire* énumère les *principales propriétés* nocives d'un déchet dangereux.

Une *classification subsidiaire* énumère les *autres propriétés nocives* d'un déchet dangereux. Ces propriétés sont jugées secondaires par rapport aux principales propriétés nocives du déchet.

La classification primaire pour chaque produit dangereux figure en haut de la colonne de classification (colonne III) de la liste II, annexe II, du Règlement sur le transport des marchandises dangereuses, et la (les) classifications(s) subsidiaire(s) figure(nt) immédiatement au-dessous.

Quelles sont les classes et divisions?

La liste ci-dessous décrit brièvement les neuf classes, ainsi que leurs divisions, et le type de danger dont il s'agit. Les classes sont numérotées de 1 à 9, et des chiffres sont également attribués aux divisions. La chiffre placé après le point suivant le numéro de la classe indique la division. Par exemple, dans 1.2, les chiffres 1 et 2 indiquent respectivement la classe1 et la division 2. La partie III du Règlement sur le transport des marchandises dangereuses contient une description plus détaillée des critères applicables à chaque classe et à chaque division.

Classe 1 – Explosifs[1]

1.1 Matières ou objets comportant un danger d'explosion en masse;

1.2 Matières ou objets comportant un danger de projection mais non un danger d'explosion en masse;

1.3 Matières ou objets comportant un danger d'incendie avec danger minime par effets de souffle ou de projection ou de l'un et de l'autre, mais ne comportant pas de danger d'explosion en masse;

1.4 Matières ou objets ne comportant pas des risques notables. Les effets d'explosion se limitent à l'emballage et n'entraînent pas de projections ou de fragments d'une grandeur ou d'une distance appréciables;

1.5 Matières ou objets très peu sensibles mais qui présentent un risque d'explosion en masse semblable à celui de la division 1.1.

[1] La classification des explosifs relève du ministère de l'Énergie, des Mines et des Ressources du Canada. Les explosifs ne *peuvent pas* être des déchets en vertu de la Loi sur les explosifs.

Classe 2 – Gaz

2.1 Gaz inflammables;

2.2 Gaz ininflammables non toxiques et non corrosifs;

2 3 Gaz toxiques;

2.4 Gaz corrosifs.

Classe 3 – Liquides inflammables

3.1 Liquides dont le point d'éclair est inférieur à – 18° C en creuset fermé. Extrêmement inflammable;

3.2 Liquides dont le point d'éclair est égal ou supérieur à – 18° C et inférieur à 23° C en creuset fermé. Très inflammable;

3.3 Liquides dont le point d'éclair est égal ou supérieur à 23° C mais inférieur à 37,8° C en creuset fermé. Pour un envoi international par aéronef, le point d'éclair est égal ou supérieur à 23° C, mais inférieur à 60,5° C. Pour un envoi international par mer, le point d'éclair est égal ou supérieur à 23° C, mais inférieur à 61° C. Modérément inflammable.

Classe 4 – Solides inflammables; matières sujettes à l'inflammation spontanée; matières qui au contact de l'eau dégagent des gaz inflammables

4.1 Solides qui, dans des conditions normales de transport, s'enflamment facilement et brûlent pendant longtemps et violemment; ou qui peuvent provoquer ou activer une incendie par suite de frottement ou en raison de la chaleur qui subsiste après la fabrication ou le traitement;

4.2 Matières sujettes à l'inflammation spontanée dans les conditions normales de transport ou lorsqu'elles sont au contact de l'air, et qui sont sujettes à la combustion spontanée jusqu'au point ou elles s'enflamment;

4.3 Matières qui au contact de l'eau dégagent une quantité dangereuse de gaz inflammables ou qui devient spontanément inflammables au contact de l'eau ou la vapeur d'eau.

Classe 5 – Matières comburantes et peroxydes organiques

5.1 Matières qui, en libérant de l'oxygène ou autres matières comburantes, peuvent provoquer ou faciliter la combustion d'autres matières, que ces dernières soient combustibles ou non;

5.2 Composé organique qui contient la structure bivalente « -0-0- » et qui est un comburant puissant qui libère de l'oxygène très facilement et qui peut être sujet à une décomposition explosive ou être sensible aux chocs ou à la friction.

Classe 6 – Matières toxiques; matières infectieuses

6.1 Solide ou liquides toxiques par inhalation, ingestion, ou par absorption cutanée de leurs vapeurs;

6.2 Organismes infectieux, ou qui sont soupçonnés de l'être avec raison, pour les êtres humains et les animaux, ainsi que leurs toxines.

Classe 7 – Matières radioactives[2]

Matières radioactives aux termes de la Loi sur la contrôle de l'énergie atomique et dont l'activité est supérieure à 74 kBq/kg.

Classe 8 – Matières corrosives

Matières qui causent un nécrose visible de la peau ou qui corrodent des métaux tel l'acier ou l'aluminium non plaqué.

[2] La classification des matières radioactives relève du Conseil de contrôle de l'énergie atomique. Les matières radioactives ne peuvent *pas* constituer de déchets, d'après la définition donnée dans la Loi sur le contrôle de l'énergie atomique.

Classe 9 – Matières ou produits divers[3]

9.1 Matières ou produits qui présentent des risques justifiant leur réglementation en transport mais qui ne sont pas compris dans une autre classe;

9.2 Matières qui présentent des dangers pour l'environnement;

9.3 Déchets dangereux qui présentent des risques justifiant leur réglementation en transport mais qui ne sont pas compris dans une autre classe;

Les classes 9.2 et 9.3 sont déterminées par Environnement Canada et par les ministères provinciaux de l'environnement. Ils se servent d'une liste de critère en plus de celles des classes 1 à 8. Ils ont recours à une liste supplémentaire de critères pour déterminer si une substance ou un produit sont dangereux pour la santé humaine ou pour l'environnement. Parmi ces critères, on trouve :

- la toxicité chronique;
- la toxicité aquatique;
- la bioaccumulation;
- la non-biodégradabilité.

Les substances et déchets qui peuvent satisfaire seulement aux critères additionnels mentionnés ci-dessus sont assignés aux classe 9.2 et 9.3.

Ces substances ou produits sont ajoutés à la liste II de l'annexe II de la façon suivante :

- effluents industriels (Type de déchet #);
- substances dangereuses pour l'environnement (classe 9.2);
- déchets dangereux (classe 9.3).

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[3] Les matières dangereuses diverses sont classées et énumérées par Transports Canada et les organismes de l'environnement *uniquement*. Les marchandises et les déchets présentant des dangers ne figurant *pas déjà* dans une autre classe font partie de la classe 9.

Comment classer les déchets dangereux désignés par une appellation individuelle (classes 2 à 6.1 et classe 8)

La responsabilité de l'expéditeur

Cette section explique comment procéder pour la classification :

- des déchets dangereux désignés par une appellation individuelle; et,
- des effluents industriels.

Les déchets dangereux désignés par une appellation individuelle figurent en lettres minuscules sous leur nom chimique spécifique dans la liste II de l'annexe II du Règlement sur le transport des marchandises dangereuses. L'expéditeur doit faire précéder l'appellation réglementaire du mot « déchet », pour indiquer qu'il s'agit d'un déchet dangereux.

Les effluents industriels sont des déchets issus d'un processus industriel particulier. Les descriptions de différents effluents figurent dans la liste II de l'annexe II du Règlement sur le transport des marchandises dangereuses. Les types de déchet (1 à 98) constituent dans ce cas l'appellation réglementaire.

Étape	Description
1.	Lire la partie I du Règlement sur le transport des marchandises dangereuses pour identifier toutes les définitions pertinentes.
2.	Lire la partie II du Règlement sur le transport des marchandises dangereuses pour savoir si l'une ou l'autre partie du règlement n'est pas applicable à votre produit ou à votre matière.
3.	Lire l'explication de l'annexe II afin d'en déterminer son emploi et pour mieux comprendre ses abréviations. Lire la première page des listes I et II pour la description des titres de chaque colonne.
4.	Consulter la colonne I de la liste II de l'annexe II du Règlement sur le transport des marchandises dangereuses, pour savoir quelle est l'appellation réglementaire exacte de votre produit ou de votre matière. Les appellations réglementaires figurent en ordre alphabétique. Ne pas oublier de faire précéder cette appellation du mot « déchet ».

a) Pour les envois intérieurs ou transfrontaliers

i) rechercher l'appellation réglementaire dans la colonne I;

ii) rechercher le numéro d'identification du produit dans la colonne II;

iii) rechercher la classification dans la colonne III;

iv) rechercher le groupe d'emballage dans la colonne VII;

v) lire la disposition particulière de la colonne IV relative aux exigences de transport spécifiques;

vi) lire la colonne VIII pour la quantité maximale ou prohibition en matière de transport aéronef et véhicule de passagers. Lire la colonne IX pour les restrictions quantitatives aux aéronef cargo.

b) Pour les envois internationaux

i) lire les dispositions particulières de la colonne IV sur les exigences ou les interdictions spécifiques en matière de transport;

ii) rechercher l'appellation réglementaire dans la colonne I, le cas échéant (une deuxième appellation est exigée dans certains cas);

iii) rechercher dans la colonne II le numéro d'identification du produit, le cas échéant (un deuxième numéro est exigé dans certains cas);

iv) rechercher la classification dans la colonne V (mer) ou dans la colonne VI (air);

v) rechercher le groupe d'emballage dans la colonne VII;

vi) lire la colonne VIII pour la quantité maximale ou prohibition en matière de transport aéronef et véhicule de passagers. Lire la colonne IX pour les restrictions quantitatives aux aéronef cargo.

Comment classer les déchets dangereux désignés par une appellation collective

La responsabilité de l'expéditeur

Cette section indique comment il faut classer les produits ou substances inutilisables désignés par une appellation collective. Les déchets désignés par une appellation collective portent des appellations réglementaires employées pour décrire des classes générales de déchets mélangés ou en solution. Ils ne figurent pas sous leur nom chimique spécifique, mais en lettres majuscules dans la liste II de l'annexe II du Règlement sur le transport des marchandises dangereuses. Dans certains cas, les lettres « N.S.A. »[4] suivent le nom de l'expéditeur et font partie du nom légal de l'expéditeur.

Étape	Description
1.	Lire la partie I du Règlement sur le transport des marchandises dangereuses pour identifier toutes les définitions pertinentes.
2.	Lire la partie II du Règlement pour savoir si l'une ou l'autre partie du Règlement n'est pas applicable à votre produit ou à votre matière.
3.	Effectuer le « test du point d'éclair » ou d'autres tests, recherche d'informations ou calculs, selon le cas. Ceci a pour but de déterminer les propriétés dangereuses du produit ou de la matière.
4.	Vérifier tous les critères énumérés dans la partie III du Règlement sur le transport des marchandises dangereuses pour les classes 3, 6.1 et 8 et les définitions pour les classes 2, 4 et 5. Déterminer la classification primaire, la classification subsidiaire (le cas échéant) et le groupe d'emballage qui correspondent à votre produit ou à votre matière.

[4] « N.S.A. » – *Non Spécifié Autrement* : cette expression désigne les déchets qui n'ont pas d'autre appellation dans la législation internationale.

5. Si vous trouvez plus d'une classification possible au cours de l'analyse du déchet, référez-vous alors au tableau de l'ordre de préséance (annexe I du Règlement) pour savoir quelle est la classification primaire et quelle est la classification subsidiaire.

6. Si vous trouvez plus d'un groupe d'emballage au cours de l'analyse du déchet, il faut retenir le groupe qui porte le plus petit chiffre romain.

7. Lire l'explication de l'annexe II afin d'en déterminer son emploi et pour mieux comprendre ses abréviations. Lire la première page des listes I et II pour la description des titres de chaque colonne.

8. Sélectionner dans la liste II de l'annexe II l'appellation réglementaire collective (« N.S.A. ») qui décrit le mieux les classifications primaire et subsidiaires. Ne pas oublier de faire précéder cette appellation du mot « déchet ».

9. Si l'appellation réglementaire porte les lettres « N.S.A. » et une astérisque (*), indiquer entre parenthèses les noms chimiques des matières qui composent le mélange, à la suite de l'appellation réglementaire « N.S.A. ». N'indiquer que les matières qui justifient que le mélange appartienne aux classes primaire et subsidiaires de l'appellation réglementaire « N.S.A. ».

10. Lire les dispositions particulières de la colonne IV, ainsi que les restrictions quantitatives et les interdictions relatives aux transports aéronef et véhicule passagers et aéronef cargo dans les colonnes VIII et IX.

Comment classer un mélange qui contient à la fois un déchet dangereux et un déchet inoffensif?

À la suite de l'appellation réglementaire, indiquer entre parenthèses le mot « mélange » ou « solution », selon le cas. Suivre alors les étapes décrites au cours de la présente section sur la classification d'un déchet dangereux.

Comment classer un mélange qui contient deux déchets dangereux ou plus

Suivre les étapes 1 à 10 de la section intitulée : « comment classer un déchet dangereux désigné par une appellation collective ».

Comment classer les déchets dangereux qui sont dilués de telle façon que leurs propriétés ne correspondent pas aux critères de classification

Dans le cas où un déchet dangereux est *dilué* et ne correspond à aucun des critères de classification, les trois situations suivantes peuvent se présenter :

1. Le Règlement sur le transport des marchandises dangereuses *ne* s'applique *pas* aux déchets dangereux lorsque :
   - ces déchets *n'ont pas* de classification subsidiaire; et,
   - ces déchets *ne* correspondent *pas* aux critères de la classification primaire énoncés dans la partie III.
2. La classification subsidiaire peut être encore appliquée pour les déchets dangereux qui :
   - d'un déchet dangereux qui porte une appellation individuelle; et,
   - qui a une classification subsidiaire autre que celle de la classe 9.2; et,
   - qui *ne* correspond *pas* aux critères de classification primaire énumérés dans la partie III.
3. La classification subsidiaire sera encore appliquée pour les déchets dangereux qui :
   - fait l'objet d'un envoi intérieur ou transfrontalier; et,
   - a une appellation individuelle; et,
   - a une classification subsidiaire de classe 9.2; et,
   - *ne* correspond *pas* aux critères de classification primaire énumérés dans la partie III.

Pour cette cas, rajouter les mots « déchet contaminé par » juste avant l'appellation règlementaire, et supprimer le numéro d'identification du produit.

Autres brochures disponibles dans la série concernant les déchets dangereux :

- Guide d'utilisation du manifeste pour le transport des déchets dangereux

Autorités compétentes

Pour plus de renseignements sur le Règlement sur le transport des marchandises dangereuses, contacter :

Transport des marchandises dangereuses
Transports Canada
Tour B, Place de Ville
Ottawa (Ontario)
K1A 0N5

Voici la liste des autorités compétentes au Canada qui peuvent fournir des renseignements sur le *système de classification des déchets dangereux*.

Expéditions provinciales et territoriales

Alberta

Industrial Wastes Branch
Standards and Approvals Division
Alberta Environment
Oxbridge Place
9820, 106e Rue
Edmonton (Alberta)
T5K 2J6 (403) 427-5868

Colombie-Britannique

Waste Management Branch
Ministry of the Environment
Parliament Buildings
Victoria (Colombie Britannique)
V8V 1X5 (604) 387-9950

Manitoba

Department of Environment, Workplace, Safety & Health
Environmental Management Division
C.P. 7, Édifice 2
139, avenue Tuxedo
Winnipeg (Manitoba)
R3N 0H6 (204) 945-7100

Nouveau-Brunswick

Municipal Affairs & Environment
Pollution Control Branch
C.P. 6000
Fredericton (Nouveau-Brunswick)
E3B 5H1 (506) 453-2861

Terre-Neuve

Department of Environment
Elizabeth Towers, Avenue Elizabeth
St. John's (Terre-Neuve)
A1C 5T7 (709) 576-2559

Territoires du Nord-Ouest

Pollution Control Division
Department of Renewable Resources
C.P. 1320, Yellowknife
(Territoires du Nord-Ouest)
X1A 2L9 (403) 873-7654

Nouvelle-Écosse

Department of Environment
C.P. 2107, Halifax (Nouvelle Écosse)
B3J 3B7 (902) 424-5300

Ontario

Waste Management Branch
Ontario Ministry of the Environment
135, avenue St. Clair ouest
Toronto (Ontario)
M4V 1P5 (416) 965-9668

Île-du-Prince-Édouard

Department of Community and
Cultural Affairs
C.P. 2000, Charlottetown (Î.-P.-É.)
C1A 7N8 (902) 892-0311

Québec

Direction de la Coordination et
du Contrôle
Ministère de l'Environnement
3900 rue Marley, B.P. 15
Ste-Foy (Québec)
G1X 4E4 (418) 643-7456

Saskatchewan

Lands Protection Branch
Saskatchewan Environment
3085, rue Albert
Régina (Saskatchewan)
S4S 0B1 (306) 787-5811

Yukon

Department of Community and
Transportation Services
Government of the Yukon
C.P. 2703, Whitehorse (Yukon)
Y1A 2C6 (403) 667-3032

Expéditions internationales

Division de la gestion des déchets
Direction des programmes industriels
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APPENDIX 6

TRAINING AIDS

TRAINING AIDS

At the present time training aids for waste management, specific to petroleum marketing operations, are in short supply. This situation is likely to change in the future as more professional and industrial associations are sponsoring the development of training materials.

Today there are a variety of specialized short courses offered by universities, trade associations and consultants aimed at industry professionals involved in such areas as groundwater monitoring and restoration of tainted aquifers, incinerator or landfill design. These are not as a rule, of general interest to marketing personnel. However, the following training materials may be of value as supplements to in-house company training programs:

- Commonwealth Films Inc. in collaboration with the Institute for Chemical Waste Management have produced a video/film about the safe handling of chemicals, hazardous and solid wastes entitled, "It Can't Happen Here". The video/film is available on a purchase or rental basis from:

  Commonwealth Films Inc.
  223 Commonwealth Avenue
  Boston, MA 02116
  Telephone: (617) 262-5634

- The Canadian Petroleum Association has prepared a videocassette entitled "Waste Management". This is available by contacting:

  Canadian Petroleum Association
  1500 - 633 - 6th Avenue S.W.
  Calgary, Alberta T2P 2Y5
  Telephone: (403) 269-6721

- The Petroleum Association for Conservation of the Canadian Environment (PACE) prepared a slide/tape presentation as an information vehicle for those interested in land treatment (landfarming) of wastes. This presentation is available from:

  PACE
  1202 - 275 Slater Street
  Ottawa, Ontario K1P 5H9
  Telephone: (613) 236-9122

- The American Petroleum Institute sponsored an audio-visual slide presentation as a training aid for landfarm operators. This training package was prepared and is distributed by:

  SCS Engineers
  4014 Long Beach Blvd
  Long Beach, California 900807

- The Ontario Ministry of the Environment has prepared an audio-visual slide presentation regarding their Hazardous Waste Regulation 309. This material is available on a loan basis by contacting:

  Ministry of the Environment
  Waste Management Branch
  40 St. Clair Avenue West
  Toronto, Ontario M4V 1P5
  Telephone: (416) 965-9668

- Canadian Industrial Transportation League has developed seminar packages on the TDGR. For further information contact:

Canadian Industrial Transportation League
2360 Dundas Street West
Toronto, Ontario M4P 4B2
Telephone: (416) 534-1101

or the

Canadian Trucking Association
130 Albert Street
Ottawa, Ontario K1P 5G4
Telephone: (613) 236-9426

APPENDIX 7

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